ARCHIVES OF OPHTHALMOLOGY.

THE EXCISION OF THE RETRO-TARSAL FOLDS, AND OTHER PROCEDURES AGAINST TRACHOMA.

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THE number of therapeutic measures against a disease bears a certain relation to its curability; the less amenable it is to treatment, the larger usually the list of remedies, many of which have a striking resemblance to sky-rockets—starting out upon their course with a great deal of noise and attracting the attention just for a moment, to disappear noiselessly and for ever in the darkness. Many therapeutic methods are never heard of again after they have been published; and the persistent silence of these authors can well be appreciated by one who has tried their treatments and found even his most modest expectations disappointed.

Such experience makes men skeptics, and disposed to look at new methods or remedies with a very critical eye before they decide upon trying them. In many instances, it is true, we cannot without clinical experiments judge of the real merits of a new therapeutic suggestion; in some cases, however, the faults and disadvantages of the new mode of treatment are so manifest that, even without a clinical trial, we are warranted in expressing an adverse opinion.

An instance of this kind has lately been furnished in the proposition to treat follicular trachoma by excising the retro-tarsal folds, so warmly recommended by French[1] as

[1] *Recueil d'ophthalmol.*, 3ième série, 5 année, Nos. 4–8.

well as German[1] authors. In the interest of the many poor trachoma patients, it is to be hoped this operation will never be granted a legitimate place in ophthalmic surgery; for well may we say of it: "The cure is worse than the disease."

Physiological as well as cosmetic reasons should induce us to enter an emphatic protest against this intentional—and, as I shall prove, unnecessary—mutilation of the eyelids.

The retro-tarsal folds have a very definite function; they are inserted between the eyelids and eyeball to insure to these organs perfect freedom of motion. Take away, for instance, the retro-tarsal fold of the upper eyelid, and this lid cannot slide up and down over the globe without at each movement dragging upon the ocular conjunctiva; and *vice versa*, it is impossible under these conditions for the eyeball to make a downward rotation without exerting an unpleasant traction and tension upon the conjunctiva of the upper lid. Whether the retro-tarsal fold be destroyed by trachoma or a burn, its absence is manifested by a greater or less degree of ptosis induced by this limitation of motion. And I have known patients who would have gladly submitted to any operation, if they could only get relief from the annoyance and the painful irritation every movement of the eyelid caused them ever since the retro-tarsal conjunctiva had been destroyed.

I also believe the great disposition to recurrent inflammations of the cornea and conjunctiva, which we observe in eyes with the retro-tarsal folds obliterated, is a direct consequence of the continuous traction and tension the conjunctiva is subjected to during the movements of lids or eyeballs.

In the light of these facts it is difficult to comprehend how anybody can conscientiously suggest the removal of the retro-tarsal fold as a legitimate procedure in the treatment of trachoma. The damage done to the eye remains all the same, whether the retro-tarsal folds have been obliterated by a burn or by disease, or by the scissors of the

[1] *Graefe's Arch.*, vol. xxx., 4.

surgeon. I have quite recently seen a most striking illustration of the deplorable effect of this operation. A young lady from whose left eyelids the trachomatous folds had been excised, complained very bitterly that ever since she could open her eye but half way; she was always conscious of the effort she had to make to keep it open; and especially in the afternoon this strain became so tiresome and made her eye so irritable that she had to close it for a time altogether.

But also, in regard to the cosmetic effect, this operation appears in a very unfavorable light; it embarrasses in the most serious manner that function of the eyelids (their motility) which plays so important and prominent a rôle in facial expression. This cosmetic point should receive far more attention and regard in all lid operations than surgeons in general have so far paid to it. They should not be contented with the fact that the operation removes the affection for which it was performed, but they should select that method which attains the desired end with the least damage to the form and functions of the eyelid.[1]

The advocates of the excision of the retro-tarsal folds, referring to the fact that under the usual treatment of trachoma there occurs always more or less shrinkage of the retro-tarsal fold, say that the operation then does not inflict more damage than the disease itself, but they claim for it the great merit of considerably shortening the time of treatment and of almost instantaneously relieving the corneal complications. These are certainly very strong points, I grant, but I assert—and I can substantiate my statement by clinical facts—that we can gain all these advantages by another procedure which is free from the objections advanced against the operation.

I was led to adopt this treatment by a mere accident. About five years ago an exceedingly nervous patient, with follicular trachoma and acute pannus, came under my care. A violent spasm of the orbicularis muscle set in when I turned the upper eyelid; and as I pushed the everted lid

[1] How indifferent in this respect many surgeons still are, we can plainly see every day by the atrocious mutilations inflicted upon eyelids, in the name of ophthalmic surgery, for the cure of entropium.

upwards in order to obtain a better view of the retro-tarsal portion, I observed that the contents of the numerous trachoma follicles were squeezed out by the pressure of the orbicularis in the form of gelatinous plugs; and by assisting this pressure a little with my thumb, I succeeded in thoroughly emptying all the follicles. The next day I was actually surprised by the remarkable improvement: all acute irritation gone; the patient, relieved of photophobia and the heavy pressure of the lids, could open his eyes without discomfort; and in a few weeks he was discharged as cured.

This result contrasted with my previous experience in such cases too much to let the observation go for naught. Beginning since that time the treatment of every case of trachoma with squeezing out the follicles, I have obtained results with which my patients and myself may be well satisfied, and when, in 1883, Dr. E. Mandelstamm, in his interesting paper on trachoma,[1] recommended this "squeezing" process, I surely expected it would soon be generally adopted and practised. But that does not seem to be the case; for if it were, such propositions, like the excision of the retro-tarsal folds, would never have been thought of. But perhaps it is not too late to gain friends for this mode of treatment; and the desire to do so may be my apology for writing a little more about this manipulation.

Upon the upper eyelid it is usually executed in this way: while the thumb or forefinger of the left hand is holding the lid everted I insert the end of the thumb or forefinger of the right hand, with its palmar side turned toward the eyeball, under the everted lid. Thus the upper tarsal border and the swollen, or infiltrated, retro-tarsal fold are placed just between the two thumbs (or forefingers); and if now these fingers are pushed toward each other, and at the same time the thumb (resp. forefinger) of the right hand is made to glide slowly forward from under the trachomatous conjunctival fold, this is subjected to a steady and continuous pressure which will force out the contents of the trachoma follicles. By repeating this manipulation several times, if

[1] *Graefe's Arch.*, vol. xxix., 1.

necessary, along the whole breadth of the eyelid, I can in one treatment remove all the trachoma follicles.

Instead of the finger we might, of course, use a small spatula or like instruments; I myself prefer using the finger, because it is always at hand, and because I can estimate the amount of pressure better with my finger than with an instrument.

Upon the lower eyelid the procedure is a little different, because the fingers can seldom be used with advantage. Here I use an old-fashioned iris forceps, with a slight bend and no teeth; with its convex side upon the conjunctiva the forceps is opened to engage a portion of the trachomatous fold; if now its branches close upon the conjunctiva and the forceps is gradually moved upward, the caught-up conjunctiva is slowly run through the branches of the forceps and thoroughly squeezed, like wet cloths run through a wringer. In the same way I deal with follicles in the plica semilunaris or in the ocular conjunctiva.

This squeezing process is very painful indeed, even under the use of cocaine; and sometimes it was necessary to use an anæsthetic. That cocaine is of so little use in this proceeding, I think, proves that its anæsthetizing effect is limited to the superficial nerves, and does not penetrate to the deeper strata upon which the squeezing expends it main force.

The evacuation of the trachoma follicles is always attended by considerable bleeding. But as severe and heroic as this treatment appears to be, I have, in no instance, observed the faintest symptoms of any unpleasant reaction. Short applications of cold water always sufficed to alleviate the pain; and on the next day the patient felt must better than before the treatment; in two or three days the conjunctiva had recovered from the effects of the squeezing process, and could be treated with those remedies necessary to complete the cure. These applications were chosen to suit the different conditions of the conjunctiva in each case. Where the conjunctiva presented only the appearance of simple chronic conjunctivitis with scanty secretion, weak solutions of sublimate (gr. $\frac{1}{4}$ ad $\frac{\mathfrak{z}}{}$ i.) were used; but where I found marked succulence of the conjunctiva and considerable catarrhal

secretion, I gave the preference to solutions of nitrate of silver (gr. v. or x.). During the period of this after-treatment the conjunctiva should be inspected from time to time, and any trachoma follicle, which may yet be discovered, is to be squeezed at once.

The foregoing method has relieved the corneal complications and cured the trachomatous process just as promptly and quickly as the excision of the retro-tarsal folds, and while just as efficient as this operation, it has the great advantage of preserving the retro-tarsal conjunctiva, and of not interfering with the functions of the eyelids. But just because this treatment restores, as far as it is possible under the circumstances, the natural state of the conjunctiva; because it does not put a cicatrix in the place of its adenoid tissue, it is self-evident that these eyes may again be afflicted with trachoma, provided the patient pursue the same habits of life and occupation, and expose his eyes to the same noxious influences which had brought on the first attack of the malady. And if the disease re-appears under these circumstances, its return is caused by conditions over which the treatment of the former attack could have no control. The question, therefore, whether or not the disease has returned, should have very little weight in determining the value of therapeutic measures; and if after the excision of the retro-tarsal folds—as the friends of this operation claim—trachoma has not been known to return, this fact does not make the procedure a whit better in my estimation, or counter balance its serious faults. If that treatment were to be regarded the best, which leaves the least chances for the disease to re-appear under any circumstances, then, of course, we should have to choose the method accomplishing just what scientific and rational treatment tries to obviate, to wit: the obliteration of the retro-tarsal folds. Their adenoid tissue is the ground in which the trachomatous germs take root and are propagated; consequently where this adenoid tissue is wanting, there is nothing left for the trachomatous germs to grow upon,—a simple and radical means, indeed, to prevent the return of trachoma, only too much after the fashion of that quack who conceived the brilliant idea of amputating people's toes for the radical and lasting relief from corns!

THE DIRECTION OF THE LYMPH-STREAMS IN THE EYE.

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I.

FROM reading the few pages which Schwalbe's lately finished "Anatomy of the Eye" devotes to the lymph-stream, one sees that practically the only point on which all observers are agreed is that the aqueous leaves the anterior chamber at its peripheric angle; where it goes is a matter of dispute. Regarding the passage from the vitreous, there is no unanimity. The majority of observers hold that a current passes through the zonula into the posterior chamber, but this is disputed by Pflüger, Schöler, and Uhthoff. Various observers, notably Stilling, have contended in favor of a stream passing out through the optic nerve, but for evidence they mainly relied on the results of injections, which besides being always open to the objection that they may form false passages, teach practically nothing regarding the *direction* of the stream. Since the noteworthy paper of Quincke,[1] the only article of any importance on the direction of the current between the optic sheaths is that of Deutschmann,[2] which simply confirms Quincke's results regarding the optic nerve, by another method. In fact, in the last thirteen years the current knowledge on this point seems positively to have diminished, for despite Quincke's clear demonstration that the current flows from the brain to the eyeball, in the subvaginal space, the more recent writers

[1] Reichert's and DuBois Reymond's *Archiv*, 1872.

[2] *Arch. f. Ophth.*, xxvii.

who have touched on the subject (Schwalbe, Stilling, Knies, Weiss) express or imply the opinion that the contrary is the case. The coloration of the nerve and its sheaths which Knies, and more notably Weiss,[1] have obtained with the ferro-cyanide-of-potassium method, they seem inclined to attribute to a passage from Tenon's space, though the assertions of the latter are so indefinite on the point that he may have had a passage from the vitreous in mind. Aside from this, the first positive evidence that a current really exists from the vitreous into the optic nerve was given, unintentionally, by Ulrich,[2] in his paper on "Glaucoma." In this article there occurs the following passage, referring to cases where he had introduced india-ink into the vitreous of rabbits: "In a number of eyes, the anatomical examination showed the whole anterior segment of the eye—*i. e.*, the most anterior part of the vitreous, the perilenticular space, the root of the iris, and the angle of the anterior chamber completely free from india-ink. No locomotion of the latter had taken place in this direction. On the other hand, there could be seen, even macroscopically, an accumulation of india-ink on the papilla, corresponding to the excavation, and, further, the cross-section of the nerve made by the enucleation showed the central canal marked by a black point. The microscopic examination confirmed the fact that the coloring matter had passed out from the excavation into the central canal, along the vessels, and with the latter had left the nerve. The granules were, in general, enclosed in lymph corpuscles, so that one received the impression that these latter had produced the locomotion. Farther into the cellular tissue of the orbit I have not followed the coloration." Ulrich's theory of glaucoma (*i. e.*, that the latter is due to changes in the iris hindering the passage through it of the fluid from the vitreous) demands, of course, only a strong stream flowing forward around the lens; and any current in the opposite direction simply detracts from its probability. This alone can account for his dismissing so important a discovery with so superficial a

[1] *Arch. f. Ophth.*, xxv.
[2] *Arch. f. Ophth.*, xxx., 4, p. 240.

misinterpretation. Being engaged, at the time the above was published, in some work on sympathetic ophthalmia, and, feeling the necessity, for the elucidation of the subject, of an investigation of the lymph-currents, I began some experiments, of which only those relating to the optic nerve and its sheaths have approached completion.

Outflow through the Optic Nerve.

Under this head come forty experiments in which india-ink, cinnabar, or the anthrax bacillus was introduced into the vitreous chamber of rabbits. The results obtained were definite and constant. When a small drop of sterilized water containing india-ink, or cinnabar in suspension, is injected into the vitreous (albino rabbits should be used) there is generally little or no reaction, and on the next day, or later, according as the injection was made farther backward or forward, one sees with the ophthalmoscope the particles collecting in the optic excavation, and, if the animal is killed a day or two after this, the macroscopic examination of longitudinal sections of the optic nerve shows the whole course of the central canal marked by a black (or if cinnabar was used, red) line, which passes out of the nerve with the vessels and can be traced, with the naked eye, for a short distance toward the rear of the orbit. Microscopically, one sees that the granules are contained in the lymph-spaces around the vessels, partly, to all appearances free, in long lines parallel to the vessels, partly enclosed in connective-tissue corpuscles and the occasional leucocytes. But beside the granules along the main trunks, they are also present along all the smaller branches which radiate into the choroid and, farther back, into the periphery of the nerve; also for a short distance along the branches passing directly back into the nerve trunk, especially, close to the point where the main vessels pass through the pial sheath toward the orbit. Near this point several fine lines are seen passing directly back into the nerve, the pial sheath, and the space between the two. In the intervaginal space and dural sheath nothing of the kind can be observed. Along the small branches to the choroid

the granules can be traced to the beginning of the latter,[1] and to the inner surface of the pial sheath along those radiating from the central vessels farther back. It is impossible to say whether the particles of pigment in these finer channels are free or enclosed in the prolongations of cells. When the pigment is introduced near the posterior pole of the eye it is discharged very promptly. The farther forward the injection is made, the longer the time required for the powder to reach the papilla, and the smaller the proportion of free granules. In this respect the vitreous is, of course, comparable to a lake in which the current of the outlet is felt mainly in its immediate neighborhood. In one case, where the india-ink was introduced but a short distance back of the lens, the first ophthalmoscopic sign that the powder had reached the nerve was on the fifteenth day. When the animal is killed later than a week after the injection, the pigment in the lymph-channels seems to be all taken up by the cells; there is none that can, with any certainty, be pronounced free. Outside the optic nerve the pigment keeps close to the sheaths of the vessels, and has been traced to the posterior end of the orbit; here, in all probability, it enters the cranial cavity through the sphenoidal fissure, but the quantity is so slight that I have been unable to detect it there by ordinary methods; and though it is hoped the point will be settled by sections through the orbital contents and anterior part of the brain, *in situ*, the preparations are not yet sufficiently decalcified to be cut.

When a small quantity of an anthrax culture is injected into the posterior part of the vitreous, one sees, on the following day, an exudation, not where the anthrax was left, but filling up the optic excavation and often concealing the papilla. The bacilli follow precisely the same channels as those into which the granules are carried, except that they do not enter the finest channels. As they multiply wherever they are carried, they are found in considerable numbers in the orbit and, where the animal lives long enough, in the cranial cavity. From here, as will be shown else-

[1] This is probably the explanation of the coloration of the head of the nerve which Weiss observed after injections of cynanide of potassium into the vitreous and fixation with ferric chloride.

where, they are carried down into the intervaginal space[1] of both nerves. Along the smaller vessels they usually do not penetrate so far toward the choroid and the periphery of the nerve as do the pigment granules, but in two cases these channels seem to have been unusually large, and the bacilli, besides being swept out into the orbit, passed transversely through the nerve to the pial sheath and penetrated the latter into the intervaginal space.

The experiments with cinnabar and india-ink have been repeated on cats, dogs, and guinea-pigs, and, ophthalmoscopically, the accumulation of granules on the papilla has been observed as in rabbits, so that although these eyes have not yet been thoroughly examined microscopically, there can be little doubt that the current from the vitreous through the optic nerve, which, for brevity, I shall call the posterior vitreous stream, exists in these animals as in rabbits; and as the condition is one not likely to be modified by natural selection, we can reasonably assume that it exists in man as well.

The Stream in the Intervaginal Space.

On this point I have only a few additions to make to the results obtained by Quincke (*loc. cit.*) in 1872, but as his important paper seems to have been practically forgotten by the present generation of ophthalmologists, I give such of his conclusions as have a bearing on our subject. As a result of trephining the skull and injecting cinnabar in suspension into the subdural space of rabbits and dogs, he found that the powder, besides reaching the spinal canal, was invariably carried down in considerable quantities, sometimes within a few hours, between the optic sheaths in both subdural and subarachnoidal spaces to the globes. The greatest quantity was always found next the eyeball; thence toward the brain it steadily diminished, there sometimes being a stretch toward the cranium entirely free from pigment. In the dural sheath and, in some cases, in the supravaginal space, cinnabar was also found, and Quincke

[1] Since there is a free communication between subdural and subarachnoidal spaces, in the opticus at least, I speak here and elsewhere, for brevity's sake, as if there were but one space between pia and dura.

believed that the pigment had passed directly through the dural sheath into the orbit. Into the suprachoroidal space and into the nerve, no pigment had penetrated. The amount of free pigment was, throughout, in inverse proportion to the time allowed to lapse between the injection into the cranium and the death of the animal. Along the other cranial nerves cinnabar was, in no case, found outside the dura mater, though from slight accumulations at the points where they pierced the latter, Quincke thought it probable that currents passed out along these nerves also.

I have repeated Quincke's experiments and have also traced anthrax bacilli, which had reached the cranial cavity from the orbit, into the same channels as those followed by the cinnabar. To the results just mentioned I have nothing to add, except regarding the passage from the subvaginal space into the orbit and into the space around the choroid. I find that there is quite a free connection between the intervaginal space and the posterior vitreous stream, at the point where the latter passes out of the nerve; so it permits easy passage from between the sheaths into the lymph-spaces around the central vessels, and thence out into the orbit, but allows little or no passage in the contrary direction. Cinnabar, anthrax bacilli, and blood I have seen, severally, carried down from the cranium to the globe, and then, at this point, out into the orbit by the posterior vitreous stream. On the other hand, this latter shows not the slightest tendency to pass into the subvaginal space. With regard to the passage into the suprachoroidal space, I have, in three cases seen anthrax bacilli carried down between sheaths from the brain and they could be clearly traced for half a millimetre between the choroid and sclerotic. But the most striking demonstration of this passage occurred in a rabbit which, as the result of an experiment, had a hemorrhage at the base of the brain, a few hours before death. The blood was carried down to the eyes in the usual way, and could be traced from the subvaginal space for a stretch of four millimetres into that around the choroid. In the cinnabar experiments the pigment lay in great masses at the peripheral end of the subvaginal space, but

had not penetrated beyond the very beginning of the choroid. In view of the results with anthrax and blood, I attribute this failure to too much cinnabar having been injected into the cranial cavity, the large masses which were carried down probably stopping the current into the suprachoroidal space entirely. The view held by Quincke, that the lymph passes directly through the dural sheath, may be partly correct. In the experiments, both with anthrax and with cinnabar, I have found the inner layers of this sheath strongly infiltrated with the bacilli or granules; but a passage clear through it has not been observed, and if it occurs at all, it must be of secondary importance to that which occurs around the central vessels. It should also be remembered that Michel[1] was able to inject the clefts of the dural sheath with difficulty or not at all, in the human opticus, the injection passing much more readily into the suprachoroidal space from between the sheaths.

Outflow from the Vitreous around the Lens.

As it is intended to reserve this subject and the outflow from the posterior and anterior chambers for another paper, I only touch upon it here to say that the results of the experiments already made have convinced me, rather against my will, that besides the posterior vitreous stream there is also an anterior stream flowing forward around the lens; as is, of course, generally accepted.

In considering the fact that part of the lymph which leaves the vitreous through the central canal must return to the suprachoroidal space from the brain, the question at once arises: Why this flowing back to the eye of what has already been used in it? To my mind, the most probable explanation is that the downward stream in the intervaginal space is due to aspiration. The fluid flows into the space from the brain because it is continually pumped out at its peripheric end into the suprachoroidal space, by the current which probably passes from the choroidal vessels into the vitreous and posterior chamber, and into the orbit by the posterior vitreous stream; just as the air is drawn out of any space by a Sprengel's pump.

[1] *Arch. f. Ophth.*, xviii.

Methods.

The india-ink and cinnabar in suspension were sterilized either by repeated boilings or by using a solution of sublimate 1:5000 instead of a normal saline solution. A few of the injections into the vitreous were made with a fine glass pipette, which was simply stuck through the sclerotic in the equatorial region, the eye being drawn down with a fine hook. But although only a small drop of fluid was injected, it might be objected that the increased intra-ocular pressure could change the direction of the outflow, and the method was modified by introducing the pipette through a small scleral incision. This always allowed the escape of a small drop of vitreous, and, as the wound remained, of course, open for some time, there could be no question of increased pressure. No difference was observed between the results of the two methods, except that where the sclera was incised the substances introduced were carried somewhat less promptly to the papilla. The injections into the cranial cavity were made by sawing out a triangular bit of the skull-cap. The dura was then lifted with a very fine hook; a fine glass pipette bent at an angle of 45° was stuck through beneath it nearly parallel with the surface, and a couple of drops of the cinnabar in suspension carefully injected. The skin-wound was then sewed with cat-gut, and the whole top of the head covered, first with iodoform-collodion, and then with several layers of a quite thick celloidin solution. It is impossible for the animals to remove this dressing, and they bear the operation admirably.

The only objection to accepting the course taken by the particles of india-ink and cinnabar as proof of that taken by the lymph stream, is that the granules can be taken up by the leucocytes and carried wherever the latter go. Now, while it is an easy matter to recognize the granules in the body of a round leucocyte, it is practically impossible, where but little pigment is present, to say positively whether it is or is not contained in the long processes of the fixed cells and of the leucocytes themselves. Teased preparations are not decisive, for granules taken up by the cells can easily be set free by the teasing. The use of the bacil-

lus of anthrax was first proposed to me by Prof. Klebs of Zürich. This bacillus has no motion of its own, and is not taken up by the cells. Its disadvantages are that it kills the animals quickly in most cases; that it does not enter the very finest channels; and that in narrow channels, with little or no current, it can pass in any direction simply by the force of its growth. Pigments should also be used to confirm the results obtained by this method; they possess decided advantages where it is desired to trace a fine stream into a large cavity and then out again, as in following the stream from one eye to the other.

With regard to the recognition of free pigment, the preparations from the eyes of animals which had been killed within a few days after the injections into the vitreous showed quantities of pigment in such long broad lines along the central vessels, that without preconception one could scarcely consider them any thing but free granules; and in the experiments where cinnabar was injected into the cranium, such quantities were carried down to the eyes between the sheaths, and thence out into the orbit by the posterior vitreous stream, that a locomotion by means of leucocytes alone was absolutely excluded. But aside from this, I hold that where bacilli or leucocytes containing pigment granules pass regularly in a certain fixed direction, with no tendency to move in the reverse direction, their path gives as good an indication of the direction of the stream as the passage of free pigment. Where, for instance, I find india-ink, brought into the posterior part of the vitreous, regularly carried out into the orbit through the nerve, but not toward the lens; or where I find the leucocytes and bacilli passing easily from the central canal and intervaginal space out into the orbit, and none, on the contrary, from the orbit or intervaginal space into the central canal, nor from the latter into the intervaginal space, I hold that this gives as clear an indication of the direction of the current as could be desired. Where it is said above that there is no passage from the central canal into the intervaginal space, it is meant that none such occurs, directly, at the point where the stream along the central vessels passes

through into the orbit. Indirectly, such passage does occur along the small vessels of the nerve. As already mentioned, pigment granules have been traced along these branches to the pial sheath, and bacilli have been observed to pass through the latter into the intervaginal space; but from this space into the nerve no passage of either pigment or bacilli has been observed. Perhaps the most striking demonstration of the strength of the posterior vitreous stream is the regularity with which the main growth of anthrax shows itself directly at the papilla, whether the bacilli be left above, below, or at the side at the time of the inoculation, twelve to twenty-four hours before.

To sum up: (1) There is a decided current flowing from the vitreous out through the central canal. This does not empty into the intervaginal space, but leaves the nerve and passes to the cranial cavity along the orbital vessels. (2) The current in the intervaginal space flows from the brain toward the eye, as shown by Quincke (confirmed by Deutschmann). This current passes not into the nerve nor papilla, but into the suprachoroidal space and with the posterior vitreous stream into the orbit. It is not improbable that there is also a certain amount of passage directly through the dural sheath, but the clefts are too fine to permit the ready passage of pigment granules or bacilli. (3) In the nerve itself the current is, in the transverse channels, toward the choroid and intervaginal space; in the longitudinal channels, toward the brain, at least for some millimetres back of the eyeball.

IRRITABLE STRICTURE OF THE URETHRA IN THE MALE, RESULTING FROM MASTURBATION, A CAUSE OF HYPERÆSTHESIA OF THE RETINA.

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ALTHOUGH the causative relations which disorders of the uterus and its appendages bear to diseases of the retina—among them hyperæsthesia—were observed and noted half a century ago, little has been written about a similar relation of the genital organs in the male.

Perhaps the best and most widely known articles upon the subject are those of Mooren and Cohn, both of which appeared in these ARCHIVES. Mooren[1] called attention, four years ago, to the frequent dependence of various diseases of the eyes upon disturbance of the genital organs in females, but did not mention the other sex, except indirectly in speaking in a general way of the effects of onanism.

Cohn devoted his article entirely to a description of the results of masturbation, and his cases were nearly all in males. Hyperæsthesia of the retina seems to have been one of the most rare disorders found by these observers. Mooren mentions only one instance, that of a female masturbator; while Cohn says "the photopsies led several times to real photophobia, and forced the patient to shut his eyes, especially when going from a dark into a bright room." These were evidently only very mild cases of hyperæsthesia, but Mooren's was a well-marked one.

[1] See also his Fünf Lustren Ophthalmologischer Wirksamkeit.

While the infrequent occurrence of such cases does not furnish argument against the dependence of the disorder upon masturbation, it yet seems to render it desirable that isolated cases should be reported. With this thought the following one is presented:

Mr. X., æt. nineteen, dark, well nourished, and with ruddy complexion, came on Aug. 4th, complaining of weakness of his eyes. He wore smoked glasses, and said he could not go into daylight without them. Strong light going into his eyes would bring on lachrymation, with pain in the eyes and head. His eyes began to be over-sensitive to light three years ago, and became gradually worse two years, during which time he wore smoked glasses constantly. By this time the use of the eyes became so painful that reading was almost impossible, and he was compelled to decline a situation as teacher in a common school. This condition has continued to the present time. V = $\frac{20}{20}$ in both eyes; and under the effects of duboisia it is the same. The appearance of the fundus, tension, accommodation, and color-perception are normal. He overcomes prisms; base out 18°; base in 6°. The retina is so sensitive that an ophthalmoscopic examination can be made only with much difficulty. Almost immediately after the light is turned into the eye he complains of faintness and becomes pale.

Finding no cause for the disturbance elsewhere, I directed attention to the genital organs. He admitted that he had masturbated for one year, ending six months before he came to me. My experience with others who fell into this habit led me to question whether he had not practised it for a longer period. Examination of the urethra revealed a small, red meatus, a stricture immediately behind the glans, and several sore spots farther back. A No. 21, French scale, olive bougie passed into the urethra gave rise to severe pain, momentary amblyopia, and faintness. He complained of occasional pain in the lumbar region; but there is no tenderness on pressure there.

He was ordered to take sodii bromidi gr. viii., with liq. potassæ arsenit. gtt. iv., after each meal; also sodii bicarb. and aloes as needed to keep the bowels soluble. In addition to this, general faradism and local galvanism to the temples, were applied thrice a week; and a steel bougie was passed into the urethra at the same periods.

Aug. 15*th.*—He says he is better, and can go in the morning and evening without the glasses. To discontinue galvanism.

Sept. 8*th.*—He says he feels better than for the past two years. He has not worn the colored glasses for several days, except a few minutes yesterday.

Sept. 14*th.*—Went to work at house-painting to-day.

Sept. 19*th.*—Still better. He is to discontinue sodium bromide; and take after each meal a pill containing strychnia gr. $\frac{1}{30}$, arsenic gr. $\frac{1}{20}$, and phosphide of zinc gr. $\frac{1}{6}$. To continue general faradisation and use of the bougie.

Oct. 10*th.*—Discharged as cured.

The prevalent opinion among neurologists seems to be that the morbific effects of masturbation are due to the direct impression of the act upon the nerve centres. Griesinger, whose very elegantly expressed opinion is cited by Cohn, finds a wider field of action. He thinks "the secret conflict between shame, remorse, and good intentions, and the irresistible impulse are, as many onanists confess, no doubt of greater importance than the direct somatic element"; but he also says that "the effects of onanism appear to be greater the earlier in life the constitution is affected and the patient becomes anæmic, the more it is accompanied by painful reflections, and the more it causes local diseases of the genital organs." This description, given twenty-four years ago, is perhaps the best on record, since it covers all the ways in which onanism can possibly affect the well-being of the subject, whether through the mental and moral faculties, or through the direct and reflex paths of the nervous system, and it is surprising that ophthalmologists have been so slow to utilize it in their special field.

In what manner were the evil physical effects of masturbation brought on in this case? There was no mental nor moral disturbance observable, nor was any admitted by the patient. He acknowledged frankly that he had gotten into the evil habit and practised it until one day some reading matter, dealing with the subject, fell into his hands, when he learned that he was endangering his health. He broke the habit then for fear of bringing on disease, and not because he suffered the moral pangs which result from the

struggle of a sensitive conscience against the animal passions.

The direct effects of the habit, from loss of semen and periodic excitement of the nervous system, would be most apt to show themselves in constitutional disturbances—anæmia, general debility, and other far-reaching functional disorders of the nerve centres. None of these were present in this case. There was disturbance of but a single function of a single extension of the nerve centres—hyperæsthesia of the retina. The impressions which the masturbator's act made upon the genital organs, and which gave rise to the visual disorder, must then have passed harmlessly through the spinal nerve centres, at least, to the reflex centres at the base of the brain. Here a corresponding irritation was set up and reflected to the optic centre. Now, is it probable that the recurrent, transient excitement incident to the act of masturbation, which spends its force mainly upon the spinal centres, would produce such marked disorder in a cerebral nerve and leave the centre of its own action unharmed? If this were so we should see such effects follow excessive venery frequently. But this is not our experience. In excessive natural indulgence the evil results show themselves, almost without exception, first in the spinal cord, as is evidenced by the early appearance of backache and impairment of sexual power.

Moreover, there can be very little difference in the manner of the discharge of the nervous energy which constitutes the orgasm, and its effects, whether it is brought about in a natural or unnatural way. But there is a marked difference in the immediate local effect of the two acts: in coition the male organ is in contact all around with soft and pliable tissues and bathed in the lubricating mucus of the vagina, which reduces friction and its consequent irritation to the lowest degree, while in masturbation the glans penis is rubbed against some part devoid of the character of the vagina, or, as many victims tell us, the whole penis is rubbed and manipulated. In this process the urethra, as all parts of the organ, undergoes rough mechanical irritation, which, after frequent repetition, leaves per-

manent soreness with or without stricture and abrasions of the mucous membrane.

Surgeons who devote special attention to diseases of the genital organs tell us that onanism is a very common cause of stricture and its accompanying irritations of the urethra. Otis refers nine per centum of cases to this cause, and S. W. Gross[1] attributes thirteen per centum to it. Beside these, others might be mentioned who likewise find onanism a frequent cause of disease of the urethra. These gentlemen have also taught us that neurasthenia in all its forms is often due to disease in the urethra, whether it is the work of onanism or gonorrhœa. My own experience leads me to believe that the cause of neurasthenia lies in the urethra more frequently even than may be inferred from the teachings of the books.

In this case the cause of the visual disturbance resided undoubtedly in the urethra. Otherwise such remarkable sympathy could hardly have existed between this passage and the retina. Upon the introduction of the olive bougie, during the examination, he complained of pain, and almost simultaneously said he could not see, and that all was blackness and darkness around him. It is true that these discomforts sometimes follow the use of a catheter when there is no abnormal condition of the eyes, but they certainly appear very rarely in the absence of disease in both the eyes and the urethra. I have never seen them occur in this order under such circumstances. When the passage of an instrument into the urethra brings them on under these conditions, they appear in this order: pain, pallor, faintness, and, with the full development of syncope, amblyopia. In this case there came first, pain, then loss of sight, and, two or three minutes later, faintness, which did not run into full syncope. The amblyopia was not dependent then upon disturbance of the inhibitory centres of the heart, which it preceded, but was the immediate effect of the irritation of the hyperæsthetic urethra by the instrument, and hence bears testimony to the existence of its causation in the urethra.

[1] "Disorders of the Sexual Organs," 1881, p. 25.

This case has convinced me of the importance of inquiring into the condition of the urinary organs in functional as well as organic diseases of the eyes, in the absence of well-recognized causes in other parts of the body. It also leads me to question whether cases III. and IV. of Cohn's series, in which his treatment failed, were not similar to it, and whether medication addressed to the urethra would not have relieved them.

The treatment pursued here was directed in the beginning to the relief of the erethrism of the genitals, for which alone the bromide of potassium was given. Galvanism, in a weak current, was used as a sedative to the eyes.

Later, the object was to exert a tonic influence upon the nervous system, which is always more or less enfeebled in such cases, even before they have reached the stage in which decided symptoms of debility are manifested. For this purpose general faradisation was used in conjunction with arsenic, strychnia, and phosphate of zinc.

The patient at this time, three months after his discharge, continues in good health; but he is advised to continue the use of the steel bougie once or twice a week for a year, to prevent recurrence of the irritation in the urethra, and to dispel any that may arise in consequence of exposure and cold-taking or other indiscretions.

CONJUNCTIVITIS GONORRHOICA WITHOUT INOCULATION.

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Translated by Dr. A. Barkan, San Francisco.

THE question might be asked, Can conjunctivitis, standing in causal connection with urethritis be possible, and nevertheless *not* be caused by transfer of the urethral secretion into the eye? It is probable that a negative reply would be given by the majority of modern ophthalmologists, but those of the older schools, last of them Jüngken, guided by humoral pathological views, were apt to consider the doctrine of metastatic inflammation as explanatory of the etiology of inflammatory condition of the eyes.

Acute venereal ophthalmia has been known for a long time. Saint-Yves gave, probably, for the first time, an excellent description of its symptoms, and Plenck, particularly distinguishes between gonorrhoic and venereal ophthalmia, "quae ab acrimonia venerea per totum corpus diffusa originem ducit." Even in our century, talented men, such as Demours, have erroneously described the suppression of gonorrhoic secretion in urethritis as the cause of syphilitic ophthalmia. Correct views were first entertained respecting ophthalmia of the new-born, and subsequently in regard to gonorrhœa of adults, in the first decades of this century; when, owing to the numerous experiences, and publications on the subject, occasioned by the ophthalmia granulosa imported from Egypt, the existence of contagious ophthalmia had been firmly established,

and the conditions necessary for its spread become known. Although, later on, the memorable experiments made by PERINGER greatly strengthened those views, yet, to the new era of ophthalmology (1850) belongs the doctrine, that direct infection of the conjunctiva is the only etiological factor of this disease. In ARLT'S text book, a strong stand is taken against every kind of metastasis. MACKENZIE considers the occurrence of metastatic and simple irritative conjunctivitis accompanying urethritis problematical. Aside from a somewhat dubious case of SWEDIAUR, he cites a case of ABERNETHY in which a double-sided purulent ophthalmia developed during the first days of urethritis, and was cured after six days of treatment. The patient, a sea captain, stated that he had suffered before simultaneously from both diseases, the eyes becoming worse at the cessation of the urethral flow, and *vice versa*. ABERNETHY had previously known similar cases, and had seen several patients exhibiting a tendency to urethritis, articular rheumatism, and irritative ophthalmia: these three affections alternated in their occurrence, like gonorrhoic iritis, as described by VETCH, MACKENZIE, and more modern authors. MACKENZIE sought a probable explanation of such cases in the nervous sympathy between urethra and the eye: whilst ABERNETHY emphatically declared the cause to be constitutional disease, and recommended suitable general treatment. MACKENZIE devoted a special chapter to gonorrhoic iritis; he refers to the exudation of lymph which filled the anterior chamber as occurring more frequently in this form of iritis than in any other (this fact has again been recently described by modern authors); he also refers in a lucid manner to the connection between iritis, urethritis, and the so-called gonorrhoic rheumatism.

In an address on syphilitic diseases of the eye ALBRECHT VON GRAEFE mentions the different forms of conjunctivitis produced by transfer of the gonorrhoic secretion; according to the degree in which the contagion from the urethra affects the eye, the individual predisposition, etc., either a blennorrhoic catarrh, more or less severe, or a blenorrhœa, a granular or a diphtheritic conjunctivitis, is de-

veloped. He seems to exclude the possibility of development of conjunctivitis, occurring with urethritis, in any other way than by infection.

HIRSCHBERG also mentions a slight abortive form of gonorrhoic ophthalmia, and cites a case complicated with gonorrhoic arthritis, in which, instead of the previous iritis, a benignant purulent conjunctivitis was developed.

Very little has been said on this topic in late ophthalmic literature, especially in that contributed by German writers. STELLWAG, ED. MEYER, and others, do not even mention gonorrhoic iritis; but of its occurrence there can, at the present time, scarcely be a doubt.[1] Most writers are entirely silent on the topic of gonorrhoic conjunctivitis without inoculation. ABADIE accepts iritis, but denies the occurrence of metastatic gonorrhoic ophthalmia.

I take the liberty of directing anew the attention of my confrères to this question, having observed several cases, which have somewhat shaken the negative standpoint heretofore maintained by me on this subject. I know full well that I offer nothing essentially new, but consider the publication of those cases justifiable, as too little confidence has been placed in former observations on the same subject, and the old question needs new discussion.

CASE 1.—Gonorrhœa, conjunctivitis, et gonyitis duplex; relapse; conjunctivitis oc. utr.; iritis dextra.

Patient presented himself with simple exudative iritis of eight days' duration, commencing with symptoms of slight conjunctivitis, acquired three weeks previous. Three years ago patient suffered from simple conjunctivitis together with gonorrhœa, from which he recovered in a short time. Patient improved under treatment with atropia, natron salicylicum, and purely expectant treatment of the conjunctivitis.

CASE 2.—Gonorrhœa, lumbago, conjunctivitis catarrhalis acuta oc. utr., profuse urethral secretion since a fortnight, slight œdema of lids, photophobia, lachrymation, and slight mucous discharge. The eyes improved under treatment with ice compresses. Patient was transferred to hospital.

[1] *Vide*, WECKER, Traité, etc., Paris, 1867; GRAEFE-SAEMISCH, vol. iv., p. 497; and FÖRSTER, *ibid.*, vol. vii., p. 86.

CASE 3.—Gonorrhœa, conjunctivitis catarrhalis acuta oc. ut., slight swelling of the tarsal part of conjunctiva; ocular conjunctiva exhibited a dirty grayish-white appearance in the temporal part of either eye; slight œdema and catarrhal secretion. Four days previous the urethral secretion suddenly ceased flowing. Gonorrhœa had lasted between two and three months. Eyes rapidly improved under simple treatment. Patient had gonorrhœa twice before without complication.

CASE 4.—Gonorrhœa, conjunctivitis oc. utr., synovitis multiplex. Patient presented himself with inflammation of the eyes of two days' duration; lachrymation; lids slighly glued together; redness and gritty sensation. Gonorrhœa since ten days, which almost entirely ceased flowing when the eyes became affected; slight œdema and venous hyperæmia of lids; palpebral conjunctiva diffusely injected, likewise the ocular conjunctiva with some fresh, reddish hemorrhagic spots. Eyes got well under light astringent treatment, whilst the patient was being treated for synovitis multiplex at the hospital.

In these cases it is evident that both eyes were affected simultaneously, or very nearly so, and exhibited symptoms of conjunctivitis of a more or less severe character. The subjects were young, strong men, whose eyes had never previously been affected, and no external injury explanatory of conjunctivitis could be detected. These cases were characterized peculiarly by rheumatic pains, and the occurrence of multiple synovitis accompanying the breaking out of conjunctivitis, or closely following that disease; they were wanting only in the third case, and indicated a few times the commencement of serious trouble. Even the form and location of the conjunctival affection were peculiar, and made me, especially in the fourth case, suspect urethral mischief. The first case is interesting on account of the relapse of catarrhal conjunctivitis with renewed gonorrhœa, an occurrence oftener observed in connection with iritis.

CASE 5.—Gonorrhœa, recovery, relapse of urethritis, conjunctivitis oc. utr., and arthritis; renewed gonorrhœa, relapse of ocular trouble, conjunctivitis, keratitis vasculosa, and arthritis.

In December, 1878, patient suffered from gastro-enteritis, soon followed by slight urethritis, and accompanied by light mucous

secretion ; two days afterwards one eye, and three days afterwards the other eye, became affected by catarrhal conjunctivitis, with rather profuse secretion. The patient, well aware of the danger of urethral secretion, denied every possibility of infection of the eyes. On the fourth day, one day after the eyes became affected, severe arthritis of the right set in, which kept the patient confined to bed for one month. He speedily recovered from subsequent herpes of the cornea and conjunctival catarrh ; gradually from arthritis, and remained well for two years.

In March, 1882, he again contracted slight gonorrhœa. Conjunctivitis in both eyes at once set in. The urethritis soon got well, but the conjunctiva became more inflamed ; there was mucopurulent secretion, and lumbago. Natr. salicyl. was administered, while the eyes were treated with one per cent of nitrate of silver, and cured in a few weeks. But arthritis gen. dextr., and again, similarly to three years previous, arthritis tibio-tarsalis, made their appearance, from which the patient did not recover for several months.

Having from these observations come to the conclusion that between conjunctivitis and urethritis there might at times be other connection than the one brought about by accidental transfer of the urethral secretion into the eye, and that this very important question was clinically well worth unbiased investigation, I was not a little astonished on pursuing my inquiries to find in medical literature a whole series of similar statements. Amongst the more recent is HIRSCHBERG'S case, cited above ; another of the same author, from Graefe's clinic of a combined relapse without arthritis, and GRIMA'S case, in New Orleans, of double gonorrhoic ophthalmia cured in ten days, combined with inflammation of the knee and hand joints, followed by iritis. Such abortive forms of gonorrhoic ophthalmia have likewise been described by GEPNER, in Warsaw, and PARIZOT. HECKER, who is mentioned and differed with by ARLT, adopts the consensual mode of development in many cases of conjunctivitis. In these cases both eyes are always affected ; and some subjects with each attack of gonorrhœa suffer from conjunctivitis. Arthritis is not rarely developed simultaneously with ophthalmia, also consensually. In CANSTATT'S Annals, 1856, LIPPERT alludes to a patient

whom he had treated the sixth time for gonorrhœa, connected each time with ophthalmia and gonyitis. Quite recently HAAB reported a case of conjunctivitis duplex in a gonorrhoic subject, which healed in six days ; he considered the case non-infectious, both on account of its course and the absence of gonococci in the secretion.

This whole question must appear to us in a new light, if we look upon this conjunctivitis as part of the general affection which so often accompanies gonorrhœa. And really a long time ago, such reliable and experienced observers as SWEDIAUR, SELLE, JOHN HUNTER, and many of their contemporaries recognized the difference between gonorrhoic arthropathia, and the common, so-called, acute articular rheumatism, and demonstrated the etiological connection between gonorrhœa and the general disease. Thus it came to pass that the internal clinicists, more especially venereologists, have remained up to this day believers in a non-inoculated gonorrhoic conjunctivitis in opposition to ophthalmologists.

The first more minute statements concerning symptomatic conjunctivitis with gonorrhœal rheumatism were made by BRANDES. He states also that SIR ASTLEY COOPER described a case illustrating this point. Relapse of the eye trouble may occur without renewed infection, the gonorrhœa not being entirely cured. The inflammatory eye affection shows itself entirely independent of the other symptoms of gonorrhœal rheumatism so far as its virulence, course, duration, increase, and decrease are concerned. In 620 cases of gonorrhoic affection in male adults, R. BERGH saw eleven cases of rheumatic gonorrhoic inflammation of the eye ; mostly cases of conjunctivitis confined sometimes to the ocular conjunctiva or retrotarsal fold ; at others to the palpebral conjunctiva. Once there was double iritis from the very commencement, and once scleritis and cyclitis ; in but four of these eleven cases did he observe also symptoms of gonorrhoic rheumatism. CULLÉRIER, physician-in-charge of the Hôpital du Midi, Paris, coincides with the opinion that there are cases of gonorrhœal ophthalmia without infection. This is in unison with MAUR-

IAC'S views. ICARD describes, under the name of "*Ophthalmie purulente arthritique*," a case of conjunctivitis with chemosis, and quick transition into catarrh, which was cured in eighteen days with astringents. The ophthalmia occurred after the gonorrhoic gonyitis began to improve; decreased, after artificial increase of the urethral flow (from bougies), whilst the gonyitis grew worse.

The most explicit and minute information, however, is found in the writings of the venereologist, ALF. FOURNIER, especially in his lexicon containing an article entitled "Accidents oculaires de la blennorrhagie." He describes two entirely distinct groups of cases; viz., "Ophthalmie de Contagion," in reality inoculated conjunctival blennorrhœa, and "Ophthalmie rhumatismale," which according to his statistics occurs fourteen times oftener than the first, and without any perceptible external cause; generally attacking both eyes, either simultaneously or in quick succession. FOURNIER divides the last-mentioned ophthalmia into: first, Descemetitis, the most frequent in occurrence, with simple hyperæmia of the iris, cloudiness of the aqueous humor, slight, superficial injection without pain or photophobia (iritis serosa of other writers); second, Iritis simplex, often with copious exudation; third, Conjunctivitis generally accompanied by slight irritative symptoms, scanty catarrhal secretion, limited at times to the caruncle, and palpebral conjunctiva. FOURNIER, who first described this form minutely, does not doubt the pathogenic connection between conjunctivitis and urethritis, because of the coincidence of distinct gonorrhoic arthritis and other forms of synovitis with them, occurring often in subjects who had suffered from eye affections and rheumatism in former attacks of gonorrhœa. A few of these cases of conjunctivitis have been observed without rheumatoid symptoms.

The inflammation manifests itself sometimes first in the eyes; at other times, first in the synovial membranes. FOURNIER most frequently found conjunctivitis in the graver cases of polyarthritis. In about 37.5% of forty-five cases of arthritis gonorrhoica the eyes were affected. In the course of different gonorrhoic infections the same pa-

tient may have simple ophthalmia, or at other times only arthritis, or both. They are different localizations of one and the same process, and originate sometimes isolated, sometimes united, from a common cause, without being mutually dependent upon each other. The surgeons GOSSELIN and LANNELONGUE agree with FOURNIER, and mention additionally the symptoms of chemosis, occasionally observed by them in the beginning. Prof. WHITE, of Philadelphia, likewise distinguishes as absolutely distinct inoculated gonorrhœal ophthalmia from the benign form of double conjunctivitis, generally accompanied by gonorrhœal rheumatism, besides the more common sclerotitis (?) and iritis. The statistics given by WHITE and FOURNIER agree in the main as to the symptoms for differential diagnosis. Whilst in seven to eight hundred cases of gonorrhœa there occurs only one case of ophthalmo-blennorrhœa, White counts one case of rheumatic ophthalmia in fifty to sixty cases of gonorrhœa—a relative frequency, therefore, of 13–14 : 1. This statement agrees in a striking manner with FOURNIER's. It is evident that there are sufficient published data to establish clearly this type of disease, too little considered by modern ophthalmologists. Many such cases remain undetected, because the oculist does not think of inquiring about urethritis, when he is consulted for simple conjunctivitis. Although all the cases observed relate to men, it has not yet been proved that the rheumatic form of gonorrhœal ophthalmia never occurs in women. Gonorrhœal rheumatism has been so rarely met with in women, that some writers deny it; but RICORD, RICHET, FOURNIER, are certain of having observed it. According to ZEISSL only one case of urethral gonorrhœa is found to every twenty cases of vaginal blennorrhœa. All writers agree that the former, from reasons yet unknown, is the only cause of this form of arthritis. It is also a well-known fact that in private as well as hospital practice urethritis is often overlooked in women. This applies, of course, in a still greater degree to eye dispensaries.

To demonstrate the importance of not overlooking existing urethral gonorrhœa in certain cases, one very interesting

illustration has been mentioned and made the subject of a dissertation by H. MARTIN—of gonorrhœa, abscess of the prostate, pyæmia, metastatic panophthalmitis, and death; the details of this case we must forego mentioning here, as it does not properly belong to our topic. If we now inquire into the character and pathogeny of that form of gonorrhoic ophthalmia, we are made aware that this question coincides with the etiology of gonorrhoic rheumatism, which cannot now be discussed at length. The old doctrine of metastasis had to be forsaken, because in most cases the urethral secretion does not cease at the breaking out of pseudo-rheumatism, and even may not decrease, as exemplified in our case No. 2. The same independence in stage and degree of urethritis has been observed in cases of iritis and conjunctivitis, and in the different forms of synovitis.

It would seem that a pre-existent rheumatic disposition (or diathesis) of an inherited or individual form exists in some cases (BESNIER), as in our third case; but in most it is wanting, and moreover would not facilitate the explanation, although several writers uphold the existence of a purely rheumatic—nay, even purulent—ophthalmia in the course of polyarthritis rheumatica (PERRIN, DRANSART). The supposition of a mysterious organic sympathy between urethra, on the one hand, and articulations, synovial sheaths, eyes, etc. (ROLLET), or the hypothesis of a reflex action (FOURNIER), or vaso-motor reflex neurosis (LEWIN), respectively, does not appear in a satisfactory light. FOURNIER lays weight upon the analogy existing between those disturbances in the general health, observable at times after simple catheterization of the urethra, articular inflammation having been observed in rare cases, which must be explained by reflex action. SENATOR is of opinion that inflammatory irritation gradually spreads from the urethra to the plexus sacralis and to the spine, where it affects the trophic nerves; that therefore articular inflammation is established similarly to some spinal affections, and to some cases of arthritis deformans. As rheumatic general affections are of comparatively rare occurrence, the views of FÉRÉOL, TRIPIER, and some others cannot be accepted, who maintain the existence

of a virulent gonorrhœal diathesis, for according to ROLLET, only one such case occurs in every thirty-five, and according to BESNIER, at the most in every fifty cases of gonorrhœa in males. BESNIER and FOURNIER have correctly pointed out that such a diathesis, with primary focus and secondary symptoms perhaps similar to those in syphilis, would not attack merely a few, especially predestined individuals. And yet to modern pathologists those theories appear to be the most acceptable which suppose an absorption of certain products from the diseased urethral mucous membrane into the blood—products endowed with phlogogenic influence upon a certain class of tissues.

This theory is indeed quite attractive to the oculist, who knows full well the great sensitiveness of the visual organ, as a region for the diverse disturbances of the constituents of the blood, for the internal parts of the eye not only offer innumerable examples of this, but the conjunctiva often enough becomes affected without external provocation by means of different infections, such as scarlatina, measles, variola, tuberculosis, etc. Benign gonorrhœal conjunctivitis might thus naturally be classed with the well-known exanthematous forms of conjunctivitis.

LASÉGUE, and more recently, WHITE, express themselves in favor of the septicæmic or pyæmic theory of gonorrhœal rheumatism, and the latter cites the opinion of AGNEW, DA COSTA and WILKS in corroboration. WILKS compares gonorrhœal gout to the polyarthritis observed after scarlatina, and in puerperio, and considers it a milder form of pyæmia, which may in a graver form occur in gonorrhœa, as in the case described by MARTIN.

It cannot now, be foretold to what extent the cocci theory, which is yet in its infancy, is destined to throw light on these dark fields of pathology. If the gonococci really are in the blood and in the fluid of the inflamed joints in cases of arthritis gonorrhoica, as recently stated by PETRONE and others, then the theory of infection would carry us a step further towards the explanation of such distant effects of urethritis, although an explanation would have to be forthcoming, why so few gonorrhoic patients

suffer from this special infliction. In future we should have to search for gonococci in the secretions of the so-called abortive cases of gonorrhœal ophthalmia. HIRSCHBERG has done so in the above-mentioned cases with negative results, the cocci being also absent in the urethral secretion.

There is little to be said concerning the treatment of the gonorrhœal rheumatic form of conjunctivitis; the usual topical, antiseptic, and slightly astringent applications are recommended. Salicylate of sodium seems to produce scarcely any effect in gonorrhoic arthritis, whilst it renders great service in the common form of polyarthritis rheumatica. Attention must be paid principally to the treatment of the fundamental trouble, general hygiene, and to the prevention of relapses.

ON THE OCCURRENCE OF MICRO-ORGANISMS IN THE CONJUNCTIVAL SAC IN PHLYCTENULAR CONJUNCTIVITIS AND OTHER CONDITIONS OF THE CONJUNCTIVA AND CORNEA.

By H. GIFFORD, M.D., Omaha, Neb.

OF late years there has been a natural tendency to regard phlyctenular conjunctivitis as an infectious disease, though no one had attempted to find the micro-organism, at least so far as I knew when making the investigations considered in this paper.

Toward the end of October, 1885, while serving as assistant physician to the ophthalmic clinic in Zürich, where an unusual proportion of severe cases of phlyctenulæ occur, I began making cultures from the conjunctival sac and from the skin pustules about the eyes in these cases, and, although I was unable to complete the investigations, the results obtained were sufficiently constant and important to warrant their publication.

Cultures were made from nineteen cases of conj. phlyct. and in no case were pathogenic cocci, concerning which later, found wanting. The natural question then was whether or not the normal conjunctival secretion might not also contain these organisms. I therefore made cultures from a number of normal eyes with the result of finding pathogenic cocci in a very considerable proportion of them.

METHODS.

All the primary cultures were made on the usual beef-extract-peptone-agar-agar. This was used in the usual test-tubes, which, after being inoculated, were kept at a

temperature of 35–37° C., at which the cocci grew rapidly at first; but they generally ceased growing in the course of forty-eight hours, unless transferred to fresh tubes. The primary cultures were ordinarily made as follows, when the secretion was only slightly or not at all increased: a platinum wire, bent into a small loop, was drawn several times over the retrotarsal fold of the everted under lid, the wire being pressed on quite firmly. The latter was then drawn over the surface of the agar and also plunged into it. When, however, the secretion was considerable a little was simply fished out of the lower conjunctival sac and the agar inoculated with it as above. If the resulting growth gave evidence macroscopically or microscopically, of the presence of more than one species, plate cultures were made to separate them. In the majority of the cases I tested the pathogenic character of the fungi by inoculations of the cornea of rabbits. With an ordinary iridectomy lance I made a pocket, 1½–2 *mm.* deep, between the layers of the cornea. The fungi from a fresh culture were then conveyed to the wound on a platinum loop and as many as possible carried into the pocket with a straight wire. This is practically the same method of inoculation as that employed by Sattler, and I describe it simply because if it is not done carefully, so as to introduce a goodly number of the fungi deep into the cornea, one may get a very slight effect from a really pathogenic fungus, owing to the well-known activity of the white blood corpuscles in rabbits. Most of the species of fungi obtained by the primary inoculations were also tested by injection into the anterior or vitreous chamber; the injection consisting of a minute particle of a fresh culture rubbed upon a small drop of sterilized water. All the inoculations of rabbits were made with instruments well cleaned with a solution of carbolic acid (5 %), the latter being carefully rubbed off with sterilized cotton. At first the conjunctival sacs of the animals were washed out with sublimate, 1 : 3,000, a few minutes before the operation, to exclude the influence of any fungi that might possibly be present in the normal rabbit's conjunctiva; but on seeing the effect of the fungi which I wished to

test, weakened by this precaution, I gave it up and relied entirely on control-wounds, which were made in another part of the cornea and contused in the same manner as those into which the fungi were introduced. It may be stated here that in no case have I obtained a serious effect from such a control-wound. It would seem probable that any fungus would produce severe symptoms when introduced into the cornea in so vigorous and thorough a way, but this is not the case. Various bacilli which I have cultivated from the air, as well as some species of cocci which occur in the conjunctival sac, produce, when inoculated in the same way, practically no reaction whatever when compared with the pathogenic species.

In the inoculations from skin-pustules, the skin above and around them was well cleaned with sublimate 1:5,000, the latter removed with sterilized cotton, the pustule broken with the platinum wire, and its contents transferred to the agar tubes. Reliable inoculations from the conjunctival phlyctenulæ are practically impossible. We generally see them after they are broken, and even when this is not the case their contents are so minute that to obtain the lymph free from the conjunctival secretion is almost out of the question.

The following are the species of micrococci which I have found in the conjunctival sac:

(1) A coccus growing in the primary cultures in milk-white glistening spots; on gelatine it also remains white. Pathogenic.

(2) At first white, then becoming orange-yellow on both agar and gelatine. In mass sticky and elastic. Pathogenic.

(3) On agar showing only the slightest tinge of yellow, on gelatine showing the same orange-yellow as in the preceding form. Pathogenic.

(4) A coccus growing on agar in tenacious masses with a slight tinge of salmon-yellow. On gelatine this color is more strongly marked. Not pathogenic.

(5) Bright lemon-yellow, growing very abundantly on both agar and gelatine. Pathogenic. This form does not

correspond exactly with either the lemon-yellow coccus of Bumm,[1] nor with that of Passet.[2]

(6) Very large; very many diplo- and quadro-cocci; also many specimens of the biscuit-form. Light salmon-yellow. Not pathogenic.

(7) Milk-white. Some individuals as large as the preceding, but averaging considerably smaller; also occurring oftener in short chains, with fewer quadro-cocci and biscuit-forms. Not accurately tested as to pathogenic character.

The isolated cocci were on the average in species (1), (2), and (3), 0.8 μ in diameter; in (4), 0.88 μ; in (5), 9.6; in (6), 1.4; in (7), 1.15.

Species (1) and (2) are perhaps the staphylo-coccus pyogenes aureus and albus of Rosenbach.[3] For the present, however, I know too little concerning their behavior toward gelatine; and moreover the microscopic appearances which in (1), (2), and (3) are quite the same, do not agree with those described by Rosenbach. All the cocci which I have obtained from the conjunctival sac occur chiefly as diplo-cocci, but also singly and as quadro-cocci, and short chains of 3–4 members. Biscuit-forms occur also, but only as occasional exceptions (6). Concerning this grouping Rosenbach says nothing whatever, nor do his figures indicate it. His figure of staph. pyog. aureus, for example, shows the cocci so crowded together that nothing can be distinguished regarding the grouping. Possibly this is only a fault of the preparation figured, for Passet (*loc. cit.*), who worked with what he considered to be the same cocci as those of Rosenbach, gives a very good illustration of the above-described peculiarities, though he fails to allude to them in the text.

Species (1), (2), and (3) generally are stained by Gram's method, but are decolorized if left in the alcohol for more than three to five minutes.

Species (4) is still more easily decolorized; (5), (6), and (7) on the contrary hold their color well for a considerable time in alcohol.

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[1] Bumm: Der Mikroorganismus der Gonorrhoischen Schleimhaut-Erkrankung. Bergmann, Wiesbaden.

[2] Passet: *Fortschritte d. Medicin.*, 1885, 2, 3.

[3] Rosenbach: Mikroorganismus b. d. Wund-Infections-Krankheiten. Bergmann, Wiesbaden.

Unfortunately, I can say practically nothing regarding the behavior of these cocci toward gelatine, since on account of a misunderstanding regarding the temperature at which the cultivation apparatus was to be kept, three full series of gelatine cultures were ruined one after the other; the last just as I was obliged to leave Zürich.

Inoculations were made from fifty-eight persons, in most cases from both eyes; generally only one inoculation was made from each case, but in some cases several were made from each eye.

From twenty-eight eyes in seventeen cases of conj. phlyct. inoculations from the conjunctival sac were made, resulting in the growth of the following species of the cocci mentioned above:

In	19 cases	species	(1) alone.
"	5 "	"	(1) and (2).
"	2 "	"	(3).
"	1 case	"	(1), (5), and (7).
"	1 "	"	(1), (7),

and a sarcina form which was not further investigated. In other words, of the pathogenic cocci (1) was found in all but two cases, in which (3) was found; (2) was found in five cases, always in conjunction with (1). In two cases of unilateral conj. phlyct. with numerous skin-pustules around the eye, I inoculated simply from these pustules, obtaining from the one case coccus (1), from the other (3). In another case I obtained (1) and (2) both from the conjunctival sac and from the skin-pustules. In a case of eczema of the face, without any affection of the eye, I obtained (3).

In four cases of conj. cat. chron. there grew once, from both eyes (1); in one case, L E, (1); R E, nothing; in one case, nothing from either eye. In a case in which R E had an atrophic conjunctiva from a catarrh which had run its course, L E still conj. cat. chron., there grew, R E, nothing; L E, (1) and (6). From the purulent mass from the anterior chamber of a case of hypopyon keratitis there grew a white streptococcus, which through my neglecting to renew the culture, died out before I got time to investigate it. In a case of infected trauma of the limbus, I obtained from

this eye (1), from the other, nothing. In a case of unilateral marginal ulcers of the cornea, there grew from both eyes (1).

In twenty-five cases with normal or only slightly hyperæmic conjunctivæ, cultures were made from both eyes with the following results: In twelve cases, both eyes, nothing; in three cases, from the one eye (1), from the other, nothing; in six cases (1), both eyes; in two cases, both eyes (1) and (6); in one case, both eyes (7); in one case, one eye (1), the other eye (6). In two cases, from which cultures from only one eye were obtained, there grew once (4) and (6); once (4). In other words, out of fifty-two normal eyes twenty-eight yielded no micro-organisms, while of the other twenty-four, twenty contained the pathogenic coccus (1). In all these normal cases, however, the number of the cocci present was far less than in the eyes with conj. phlyct. In these latter the number of colonies which developed in the primary cultures was on the average ten to twelve; in the normal cases, on the contrary, not more than two. The small white coccus from the normal eyes is provisionally classed with (1) from the cases of conj. phlyct., because the agar cultures present no points of difference either micro- or macroscopically. In pathogenic properties it appeared to me to be somewhat less infectious than the cocci from the phlyctenular cases; but for the present I do not feel justified in making any distinction.

Noteworthy in all the cultures was the almost entire absence of bacteria forms other than micrococci. In only one case did a bacillus occur; and in one other a sarcina-form. (Neither of these were cultivated further.) On the other hand, in the few attempts which I have made to cultivate the gonococci—that is, from cases where considerable secretion remained constantly open to the air, the cocci were continually overgrown with various forms of bacilli. On this point my results also contrast sharply with those of Sattler,[1] who in his cultures from the pus of dacryocystoblennorrhœa found the cocci always, or nearly so, mixed with bacilli.

[1] Sattler: *Bericht d. Ophthal. Gesellschaft. z. Heidelberg*, 1885.

Pathogenic Characters.

When I speak of a coccus as pathogenic, it is meant that when used to inoculate a rabbit's cornea, it causes a severe keratitis with marked iritis, and exudation into the anterior chamber. (I have observed genuine hypopyon but seldom.) The process progresses for two or three days, then becomes limited, and, in the course of a month, leaves only a dense opacity behind. Introduced into the vitreous the pathogenic cocci produce a severe inflammation, which converts the greater part or the whole of the vitreous into a mass of cheesy pus, and may produce panophthalmitis. The non-pathogenic cocci, on the contrary, produce in the cornea only a small infiltration, scarcely larger than the original wound, with practically no involvement of the iris. In the vitreous they cause a slight inflammation, which soon limits itself, leaving the greater part entirely clear. Only where they are introduced in very large quantities do they produce symptoms comparable in severity with those caused by the pathogenic forms. By bringing these latter into the conjunctival sac of rabbits, I have attempted to cause phlyctenulæ, but without success. Where I first made slight wounds in the conjunctiva, these often became inflamed, without showing any genuine vesicles, however. I have had no opportunity as yet of trying the fungi on the human conjunctiva.

Regarding the etiology of conjunctivitis phlyctenulosa the foregoing *proves*, of course, nothing. It makes it somewhat probable, however (and in this connection I consider the cultures from the skin-pustules of particular value), that the first three species of cocci mentioned above, bear some causal relation to the disease. The primary injection may perhaps occur from the conjunctival sac, or, as in the cases where numerous vesicles break out at once on various parts of the body, by way of the circulation. If further investigations show that there is really no distinction between the white cocci of the skin-pustules and conjunctiva of the phlyctenular cases, and those from the conjunctiva of normal eyes, it will certainly seem more probable that in many cases at least, the injection occurs from the con-

junctival sac. Why, if this be the case, the cocci should attack certain eyes and leave others uninjured, may depend on the weaker resistance of the cells of badly nourished children; and the cause of the frequent occurrence of phlyctenulæ at the limbus may consist in the furrow formed at the junction of the cornea and conjunctiva favoring the collection of the fungi (as in the marginal ulcers of gonorrhœal ophthalmia), especially when from any cause the conjunctiva becomes slightly swelled. But particularly for the etiology of the phlyctenular ulcers of the cornea is the occurrence of the cocci of significance. The extreme frequency with which these ulcers occur in the lower half, or even lower quadrant, of the cornea, speaks most decidedly for an infection from the conjunctival sac. The cocci collect naturally in the lower sac, the upper one being much more thoroughly washed out by the tears.

The etiology of the skin-pustules about the eyes is clear enough. Garré [1] obtained a fine crop of pustules, each one of which presented a pure culture of staphylo-coccus pyog. aureus, by rubbing a culture of this fungus into his forearm. The children, inadvertently, make a similar experiment with their cocci-containing tears.

The following cases are given to emphasize a point of special importance.

I.—*Oct.* 27, 1885.—Lina R., five years. Parents report inflammation of both eyes for eight days. Status. præs.: R E conj.-phlyct. Several vesicles on the limbus. L E above and below large and deep marginal ulcers of the cornea, larger below. Conjunctiva moderately swollen; muco-purulent secretion somewhat profuse. Conjunctiva of upper lid covered with diphtheritic exudation in several places. Skin-pustules around the eyes, mostly on the left side. Treatment: Both eyes washed out with sublimate 1:2,000; L E firm antiseptic bandage.[2]

Oct. 31*st.*—Agar cultures from conjunctival sac, corneal ulcer,

[1] Garré: *Fortschritte d. Med.*, 1885, 6.

[2] This bandage was always made in Zürich with a considerable quantity of cotton soaked in sublimate 1:5,000; it was removed daily, the eye being thoroughly washed out with the sublimate solution each time. The action of the pressure bandage in these cases is somewhat difficult to explain; for the present, I do not attempt it, as it will probably be made the subject of a special paper by another writer, before long.

and skin-pustules, from all of which there grew cocci (1) and (2). From the pustules, however, there was only one colony of the yellow cocci to twenty of the white. Rapid improvement under good food and pressure bandage.

Nov. 16th.—Yellow ointment ordered for both eyes; before using it, however, cultures made from conjunctiva of both eyes, from which grew (1) and (2), but quite sparingly.

Nov. 21st.—Cultures again from both eyes, none of which developed.

Nov. 22d.—In the course of two hours both eyes washed out several times with sublimate 1:5,000; then, a half to three quarters of an hour later, cultures from both eyes. In those from the right eye nothing developed, in those of the left (1) sparingly. Case dismissed with yellow ointment.

II.—*Dec.* 5, 1885.—Mrs. R., fifty-nine years. For some years R E has been failing. For a year and a half has been unable to see light with it. Received into the hospital ten days ago. At that time, R E cataract. Iris thoroughly degenerated and discolored. No perception of light. Numerous shallow marginal corneal ulcers involving almost the entire circumference. Conjunctiva only slightly irritated. L E normal. Treatment: Washing out with sublimate 1:2,000, antiseptic pressure bandage. Case has progressed very favorably. To-day, culture from both eyes, from which R E (1); L E (1) and (7).

Dec. 8th.—Cultures again with growth of (1) and (7) from both eyes.

Dec. 10th.—Since yesterday bandage omitted, and warm applications made. To-day the old cicatrices show several fresh infiltrations (which disappeared on the renewal of the pressure-bandage).

Dec. 18th,—Since the 10th R E has been twice washed out with sublimate 1:2,000, in the most thorough manner. Cultures from both eyes again, from which (1) developed sparingly.

Dec. 31st.—Since the 18th the bandage has been twice left off and each time fresh infiltrations have occurred only to disappear on the renewal of the bandage. Agar cultures again show presence of coccus (1)in both eyes. About this time I left the hospital, but heard Jan. 10, '86, that the case was doing well under treatment with nitrate of silver, without the bandage.

These cases show as clearly as possible the unreliability of the washing out of the conjunctival sac with sublimate

1:5,000 which is now so much in vogue preparatory to an operation. In nearly all my cases of conj. phlyct. the inoculations were made after the eyes had been bandaged antiseptically for one or more days. Also in two cases, where iridectomy had been performed with a good result, I found, after the eyes had been washed out and bandaged antiseptically for nearly a week, cocci (1) and (7) sparingly. I by no means wish to discredit the well-established antiseptic properties of the sublimate, but I do assert that as it is ordinarily used it is by no means efficacious in disinfecting the normal conjunctiva; either because of the difficulty of reaching all the corners of the sac, or from its property of causing albuminate precipitates, by which the solution is weakened, and the fungi perhaps directly protected. The last case is also of interest with reference to conj. phlyct. It presents an eye with its nutrition impaired by disease, and continually attacked by fungi, which leave the other healthy eye entirely unharmed. It is comparable, at least, to a couple of children, the one well nourished, with healthy eyes; the other, anæmic and with conj. phlyct.; both with pathogenic cocci in the conjunctival sac.

We have now to consider why if pathogenic micro-organisms occur in many, if not all, normal eyes, more operated eyes are not destroyed. The answer is, that an infection of an incised wound is by no means so constant an accident as some oculists, especially on the other side of the Atlantic, seem to believe. In other mucous membranes also, well supplied with blood and bacteria, incised wounds heal in the most desirable way; and in the number of bacteria present, the conjunctiva is far behind the membranes of the nose, the mouth, and the intestines, as one could *a priori* conclude from its position. The severe reactions which one observes every now and then in spite of antiseptic precautions, especially when more or less contused wounds are made, find in the foregoing their simplest explanation. But though the conditions in incised wounds of the cornea are not favorable for the occurrence of an infection, since the edges of the opening either cohere at once or are kept clean by the continually escaping aqueous, the situa-

tion is quite different when, in any way, a colony of cocci is carried deep into the anterior chamber or vitreous. Here they cannot be so quickly hedged about by leucocytes, and their growth obtains an impulse which ceases only after the most disastrous consequences. The severe inflammations which sometimes follow the penetration into the eye of bodies which, without prejudice, we should certainly regard as aseptic, are in full accord with the above. These bodies need not be septic if they only carry with them from the conjunctiva a colony of pathogenic cocci. In serpent ulcers also it seems probable that even in the cases where no dacryocystitis is present, the evil effects of traumata from hop-poles, pear-stems, twigs, etc., depend less upon the infectious character of these bodies than upon the badly lacerated and contused wounds which they inflict. This seems especially probable when we consider that the micrococci have no spores, and die out quickly when not frequently transplanted to fresh soil.

The better results which have positively been obtained in operative ophthalmology by the use of antiseptics (including washing out the sac with solutions of sublimate) are undoubtedly due partly to the cleaner hands and instruments used, partly to the cleansing of the surface of the eyeball, which, while not preventing cocci from remaining in the depths of the conjunctival sac, tends to prevent them from being rubbed into the wound surface or carried into the anterior chamber with the knife or forceps.

Finally, these results show that in testing the antiseptics to be used in eye surgery, we must try them on the fungi as they exist in the conjunctival sac; not alone as has been done by Schmidt-Rimpler, on the pus of dacryocystitis, nor on pure cultures from such pus, as has been done by Sattler.

That this paper is very incomplete, especially from a morphological standpoint, I appreciate thoroughly, but the fact that it became absolutely necessary for me to interrupt the work at its present stage, with no certainty as to when it could be taken up again, will perhaps be considered a sufficient excuse for my allowing the results already obtained, to be published.

A CASE OF CONVERGENT SQUINT ASSOCIATED WITH MYOPIA OF HIGH GRADE; TENOTOMY OF BOTH RECTI INTERNI MUSCLES; RESTORATION OF BINOCULAR VISION, THE DIVIDED MUSCLES STILL RETAINING A PREPONDERANCE OF POWER.

By SAMUEL THEOBALD, M.D.,

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THE association of non-paralytic convergent squint with myopia is met with so rarely, that every such case is of interest to the student of ophthalmology, and deserves to be placed on record. Von Graefe, who observed cases of this character, explained their occurrence in this wise: In myopia, uncorrected by glasses, when the eyes are much used in near vision (as in reading or writing), the binocular far point being but a short distance from the eyes, and the convergence of the optic axes excessive, the recti interni muscles in exceptional instances become abnormally developed and shortened, while the externi, on the other hand, from constant stretching, become preternaturally lengthened and weakened; until, in course of time, a point is reached when the externi are no longer able to restore the (approximate) parallelism of the optic axes necessary for distant vision—and a convergent squint is established.

The rarity of this variety of squint is due, doubtless, to the fact that its development is dependent upon a concatenation of circumstances seldom met with, namely, in conjunction with myopia, interni muscles of more than average strength, opposed by weak externi, and, furthermore, asso-

ciated with ciliary muscles of but little power, so that the relationship commonly existing between the movement of accommodation and that of convergence of the optic axes shall be so modified that, instead of the usual parallelism between the two, a high degree of convergence shall be accompanied by a relatively slight movement of accommodation. The myope may suffer many ill effects from the too constant use of his eyes in near vision; but, unless the unusual conditions which I have enumerated be present, a convergent squint will certainly not be one of them.

In the following case the squint evidently developed in the manner suggested by von Graefe.

Mrs. M. J., widow, æt. thirty-nine, by occupation a dress-maker, consulted me, Oct. 17, 1885, on account of a convergent squint of the R eye, of some years' standing, which was especially annoying because accompanied by persistent diplopia. For fifteen years she had been in the habit of sewing a great deal (chiefly with a machine), and had also been a constant reader. She had a pair of $-\frac{1}{10}$ s eye-glasses, which she used in distant vision, but in near vision she had never worn glasses. She thought the squint had existed at least ten years; but was sure that it was not present "when she first grew up," and in proof of this showed me photographs of herself, the first taken at about fourteen years of age, the other at twenty-one, which seemed to confirm her statement. There was nothing in the history of the case, or in the way in which the squint made its appearance, to suggest that it was of paralytic origin.

The presence of annoying diplopia in a convergent squint of years' standing struck me at once as anomalous (for I am a firm believer in the doctrine that amblyopia is soon produced in a squinting eye through active suppression of its retinal image); but the anomaly was explained when it was discovered that *in reading the patient enjoyed binocular vision.* In this way the retina of the squinting eye, and especially that portion about the yellow spot, was continually exercised in conjunction with the other eye; the supervention of amblyopia was thus prevented, and the result was persistent double vision for objects beyond the binocular far

point (r_2), which, as we shall see, was between 6″ and 7″ from the eyes.

There was an evident want of power in both of the recti externi muscles, shown by an inability (and also by a disinclination, as though the effort were trying) to abduct either eye strongly. The squint showed no disposition to alternate, fixation being always with the L eye, and the R eye squinting inwards whenever the object regarded was more than 6″ or 7″ distant.

At the first examination each eye accepted $-\frac{1}{54}$ s, which gave for each V = $\frac{20}{XX}$. Held at about 6″, J. No. 1 was read with *both* eyes without difficulty. With a prism of 13°, base outwards, binocular fixation for objects 12″ distant could be obtained; but, in distant vision, the images of a candle flame could not be brought together even with a prism of 25°. The ophthalmoscope showed in the R eye an unusually healthy fundus, considering the grade of myopia; in the L eye, more decided thinning of the retinal and choroidal pigment. In neither eye was there an appreciable amount of astigmatism. With $-\frac{1}{12}$ s each eye read J. No. 1 at about 12″, but to enable both eyes to do this the addition of a prism of 13°, base outwards, was required.

A tenotomy of the internal rectus muscle of the R eye was proposed, and assented to by the patient, as she was anxious not only to be rid of the deformity, but to be relieved of the great annoyance caused by the diplopia. Accordingly, on the following day, Oct. 18th, the operation was performed with the eye under cocaine, the tendon being divided subconjunctivally (from below). The immediate effect of the operation was to give the patient binocular vision for objects not further than 15″ or 20″ from the eyes, and this, with some slight intermediate changes, was about its permanent effect. In distant vision, however, there still remained a slight squint. With $-\frac{1}{18}$ s spectacles, which were now ordered for near vision, the patient read J. No. 1 with both eyes at a comfortable reading distance; but, to obtain binocular distant vision, a prism of 13°, base outwards, was required, and a still stronger one preferred by

the patient. The refraction was now tested again carefully, and gave for each eye V = $\frac{20}{XX}$ (except one letter) with $-\frac{1}{6}$ s. With $-\frac{18}{64}$ s, V = $\frac{210}{XXX}$ was obtained, and spectacles of this strength were ordered for distant vision. After the first tenotomy, the patient declared, notwithstanding there was still a residual squint in distant vision, that the diplopia had disappeared. From which it would seem that the double vision which had chiefly annoyed her before must have been for objects within one or two feet of the eyes, the projected images of which would lie relatively close together.

Five weeks after the first operation I ventured to divide the internal rectus of the other eye, feeling myself warranted in doing so, because, besides the existence of the residual squint in distant vision, the cover test showed, in near vision, a decided preponderance of power in the interni muscles, each eye squinting inward when covered, not only when the test was made with glasses which corrected wholly or in part the error of refraction, but even when this was entirely uncorrected. The tendon was divided subconjunctivally, under cocaine, as in the first operation, and the result was the establishment at once of binocular fixation for all distances.

As I had some misgivings as to the propriety of operating upon the second eye, lest an insufficiency of the interni muscles might be produced, I was gratified to find, after the second tenotomy, that they still retained an excess of power. The patient was seen last on Jan. 6th, nearly three months after the first operation, and more than six weeks after the last one. She was then rid of the diplopia, had no asthenopic symptoms, and enjoyed binocular vision at all distances. With her $-\frac{1}{64}$ s glasses, the two eyes together had V = $\frac{20}{XX}$ (except one letter); and with the $-\frac{1}{18}$ s prescribed for near vision, she read J. No. 1 with ease. In distant vision, with her correcting glasses, the cover test showed a slight inward movement of the excluded eye; but a prompt outward movement restored binocular fixation as soon as the cover was withdrawn. In near vision, both with and without correction of the myopia, the test gave

a like result. I flatter myself, therefore, that the risk of ultimate insufficiency of the interni muscles is extremely remote, though some of our pessimistic confrères will, perhaps, think otherwise. However, I shall endeavor to keep the case under observation, and if such change should occur, will report it.

CONTRIBUTION TO THE KNOWLEDGE OF XANTHOPSIA.

By Dr. RICHARD HILBERT.

Translated by J. E. Weeks, M.D.

WHILE in the literature of the last few years quite a number of cases of erythropsia[1] are described, and while this affection does not appear to be of very rare occurrence, as almost every oculist has had patients who, after cataract-extractions, for example, have complained, at times, of it, xanthopsia is a condition allied to erythropsia, but much more rare in occurrence and much less frequently described.

So far as I am aware, the first case of xanthopsia was described by Niemetschek.[2] The case was one of a bullet wound. The ball entered the left ala of the nose and split in two pieces; one piece passed out at the right inner angle of the nose, the other through the right cheek. The patient was blind in the right eye for three weeks, then followed monocular diplopia and xanthopsia in the same eye for three or four weeks longer. When the patient resumed work, the face became swollen, the yellow vision returned, and he suffered severely from headache. Aside from a very small pigment spot near the equator, the fundus was normal. Niemetschek was, very correctly, of the opinion that the disturbance of vision was due to some central affection.

[1] The entire literature on erythropsia is as follows: Purtscher: Weitere Beiträge zur Frage der Erythropsie. *Centralbl. f. prakt. Augenheilk.*, 1885, February and March.

[2] Niemetschek: *Prager Vierteljahrsschrift*, No. 99, March 25th, p. 61. Refer. in Virchow-Hirsch's *Jahresbericht*, 1868.

The second case was described by Kesteven.[1] On the 15th of July a woman, age twenty-three years, was prostrated by the heat. Severe occipital headache followed immediately, and the patient saw every thing green and red (?). After a few days the pain and the peculiar visual disturbance passed away. A very slight neuritis optica in the right eye was visible with the ophthalmoscope. The left eye was normal throughout. To the right eye every thing appeared yellow for more than three months after the insolation.

Dr. Purtscher, of Klagenfurt, reported by letter a third case to me which occurred in a patient, who had suffered from severe typhoid fever, during convalescence. Dr. Purtscher attended the case. The peculiar disturbance of vision, of which the patient complained, caused all objects to appear of an orange color. The condition which, I think, may be classed under the head of xanthopsia, lasted a number of months.

In conclusion I will report a case which occurred in my own practice. Mr. E. K., a lawyer, of medium size and strongly built, is subject to epileptic seizures every six to eight weeks. About twenty-four hours before every seizure, all objects appear of an intensely yellow color to him, which condition continues up to the time of the seizure and then passes off. It is well known that many epileptics experience an "aura" with disturbance of the color-sense. (Dimmer[2] has remarked that erythropsia was of the same nature as the aura.) The aura is certainly an immediate forerunner of the epileptic seizure. In this case the disturbance of the color-sense did not seem to correspond with the aura, but appeared to be due to separate irritation of the color centre. The phenomenon preceded the seizure by twenty-four hours, and just before the fit a true aura, in the form of an acoustic conception, was experienced. He usually cried, "Do you hear the music?" and immediately became insensible. Mr. K.'s vision and field of vision were normal, refraction hyperopic, + 0.75 D. The fundi before and

[1] Kesteven: Xanthopsia; Clinical Society of London, Jan. 27, 1882. Also Case of Xanthopsia or Perverse Color-Vision. *Med. Times and Gazette*, 1882, February, p. 131.

[2] Dimmer: Zur Erythropsie Aphakischer. *Wiener med. Wochenschrift*, 1883, No. 15, p. 436.

during the yellow vision appear normal. The disturbance of the color-sense in this case was evidently central, and, in my opinion, resembles the color hallucinations so often observed in the insane.[1]

Niemetschek considers his case to be dependent on central disorders, and, from his line of argument, this view cannot be refuted. Kesteven does not discuss thc question of the seat of the lesion in his case. I am convinced, however, that we must class this with the other symptoms that accompany insolation, which is plainly a central affection. We cannot find in neuritis optica the cause for yellow vision, as this symptom is extremely rare in neuritis. It is well known that in many cases of severe typhoid fever, varied cerebral symptoms are manifest during convalescence, of which yellow vision is a rare one. The orange-color vision of Purtscher's patient could have its origin nowhere else than in the central nervous system. It is evident to my mind that all other lesions to account for this peculiar color disturbance must be excluded.

In conclusion I will say that yellow vision, at times, directly precedes a fainting spell, lasting from a few seconds to half a minute, followed by dimness of vision and loss of consciousness. The expression "every thing is green and yellow before the eyes" is used by the laity to describe this stage, and originated from frequent observation of this symptom. No argument is required to establish the fact that this form of yellow vision is of central origin. Xanthopsia is therefore of central origin,[2] as are all the pathological color-perceptions which correspond to that claimed by Purtscher for erythropsia.

It is much easier to arrive at the approximate cause of xanthopsia than of erythropsia, since we are able to produce the former, experimentally, by direct influence on the color centre. This is demonstrated in the experiments with santonine, published by Mari,[3] and the experiments with picric

[1] Griesinger: "Pathologie und Therapie der psychischen Krankheiten," Braunschweig, 1876, p. 88.

[2] Hilbert: Zur Kenntniss der pathologischen Farbenwahrnehmungen. Ein Versuch einer Pathologie der Farbenempfindungen. *Memorabilien*, Bd. xxix., 9, p. 326.

[3] Mari: La Santonina e la Visione dei Colori. *Annali di Ottalmologia*, 1883, Bd. xi., 6.

acid, described by the author.[1] It is also possible that other drugs may produce the same effect, as, for instance, toluylendiamine,[2] which colors the skin and sclera yellow. In regard to yellow vision from icterus, no very exact observations or experimentations are published, and it is not decided whether the yellow vision is due to disturbance of the central nervous system, or simply to staining of the refracting media of the eye with the coloring substance of the bile, as sometimes occurs during the absorption of intraocular hemorrhages, occasioned by the diffusion, through the vitreous, of the coloring substances of the blood.

The production of erythropsia and xanthopsia by the same excitation of the nerve centres, may, according to my opinion, be explained as follows: red and yellow, the latter to a lesser degree, produce the most intense and the most enduring impressions on the sensorium. We can easily see that that part of the brain which imparts these impressions is the easiest to excite, either by direct or by reflex influences. The phenomenon first observed by Preyer[3] and Genzmer,[4] and later by Allen Grant,[5] that infants recognize first red and yellow, generally when a few months old, and cannot distinguish green and blue before the second year, argues in favor of the theory advanced above. This also is in accord with the results arrived at by Magnus,[6] in his tests of the color-sense in the aborigines, Graber,[7] Lubbock,[8] and Mereschovsky[9] in their color-tests with animals.

[1] Hilbert: Ueber Xanthopie verursacht durch Pikrinsäure. *Centralbl. f. prakt. Augenheilk.*, 1885, March.

[2] Stadelmann: Das Toluylendiamin und seine Wirkung auf den Thierkörper. *Arch. f. experimentelle Pathologie und Pharmakologie*, 1881, Bd. xiv., p. 231.

[3] Preyer: "Die Seele des Kindes. Beobachtungen über die geistige Entwickelung des Menschen in den ersten Lebensjahren." Leipzig, 1882.

[4] Genzmer: "Untersuchung über die Sinneswahrnehmungen des neugeborenen Menschen." Halle, 1882.

[5] Grant, Allen: "Naturstudien. Bilder zur Entwickelungslehre." Translated by E. Huth. Leipzig, 1883.

[6] Magnus: "Ueber ethnologische Untersuchungen des Farbensinnes." Sammlung wissenschaftlicher Vorträge," herausgegeben von Virchow und Holtzendorff. Berlin, 1883.

[7] Graber: Fundamentalversuche über die Helligkeits- und Farbenempfindlichkeit augenloser und geblendeter Thiere. Sitzungsberichte der K. K. Academie der Wissenschaften, mathematisch-naturwissenschaftliche Classe," Bd. lxxxvii., Nos. 4–5, p. 201.

[8] Lubbock: On the Sense of Color among Some of the Lower Animals. *Jour. Lin. Soc. Zool.*, vol. xvi., p. 121, and Nat. 27, p. 618, 1883.

[9] Mereschovsky: Les crustacées distinguent-ils les couleurs? *Compt. rend.* 93, No. 26. Untersuchte Daphnia pulex. L.

A CASE OF ASTIGMATISM OF THE LENS AFTER IRIDECTOMY.

By Dr. HJ. SCHIÖTZ, of Christiania.

Translated by Dr. J. H. Shorter, N. Y.

The patient, N. N., thirty-three years old, was admitted to the ophthalmic department of the Royal Hospital four years before an account of sympathetic iridocyclitis of the right eye. The left eye was enlarged, staphylomatous, and amaurotic, with leucomatous cornea. It was enucleated. After an iridectomy upwards had been performed on the right eye, the patient was discharged cured, with vision $\frac{20}{200}$. The pupil was free except at the lower border, where it was attached to the lens capsule by two thin synechiæ. On the latter was a number of brown pigment spots.

On the 22d of December, 1884, the patient was again at the eye clinic, as the eye for four weeks past had been a little red and painful. The vision seemed a little reduced, as if veiled.

The patient had sought medical aid, and improvement soon set in. When he presented himself at the clinic, he was still under influence of atropine.

Status præsens.—On the appendages of the eyes there was nothing to be observed. Conjunctiva pale, no ciliary injection, the cornea clear, upwards was a linear scar from the operation of four years previous. The middle of the scar was in the cornea, about 1 *mm.* inside of the limbus. The anterior chamber of normal depth. In the upper portion of the otherwise normal iris a coloboma 6 to 7 *mm.* broad. The edges of the iris bordering on it, clear-cut and free. The pupil moderately dilated (atropine), with regular and symmetrical border, except at the lower part, where two synechiæ stretch from the pupil to the lens capsule. On the latter can be seen numerous brown spots, and above a large brown pigmented lump. The media were clear, the fundus normal.

The disc in the inverted image was perpendicularly oval; in the upright image, horizontally oval. The field of vision was not contracted.

Vision $= \frac{20}{200}$; when, however, the patient presses with the finger on the upper lid directly over the cornea, the vision becomes $\frac{20}{40}$. He hit upon this device himself, since the operation of four years before. From that time on he saw well; but since the iridectomy, whenever he wished to see distinctly, it was always necessary to press on the eye. A previous examination with glasses showed an astigmatism of five or six dioptries.

I expected, at all events, to find in this case the greater part of the astigmatism in the cornea; but by the opththalmometrical examination undertaken later with the Javal-Schiötz ophthalmometer, the cornea showed itself to be perfectly regular—in fact, uncommonly spherical.

I examined the cornea of the patient carefully by means of images, as well of $1\frac{1}{2}$ *mm.* as of 3 *mm.* size (prisms, $1\frac{1}{2}$ and 3), and made also a keratoscopic examination by means of the Javal disc.

By means of the Javal optometer an astigmatism of five dioptries was demonstrated.

The joint examinations gave the following results:

Radius of the cornea . . .	7^{53} *mm.*
Ophthalmometer	$0° \pm 0$
Optometer	$98° - 5 + 2$
Vision	$\frac{20}{40}$

I next undertook an ophthalmometrical examination while the patient pressed on the eye with the finger, as he was accustomed to do in order to improve his sight. It showed that he brought out thereby an astigmatism of the cornea with meridian of greatest refraction about vertical.

Radius of cornea in meridian of least refraction $= 7''$ *mm.*

Ophthalmometric examination, $170° \pm 4$ (about).

Naturally the astigmatism varied according to the strength of the pressure with the finger.

In the foregoing case, as the cornea was shown to be throughout spherical, the astigmatism of the eye must be ascribed exclusively to the lens. The astigmatism of the latter amounted to about five dioptries with axis of greatest refraction horizontal.

In order to see distinctly the patient compensated for this natural astigmatism by an artificial astigmatism of the cornea with meridian of greatest refraction vertical, as could be brought about by the pressure over the cornea. Whether in ordinary seeing the

patient had, as compensation, to call forth a corneal astigmatism of five dioptries, or whether he satisfied himself also here with the four dioptries as above found, could not be decided.

As already said the astigmatism varied according to the pressure of the finger; it was sometimes more, sometimes less than the four dioptries which are present at the moment of reading it off.

In the examination the individual looks into the opening of the telescope, and as our patient had thus no definite object to look at, he was not in a position to decide exactly how strongly he had to press to gain the most perfect sight possible.

It is well conceivable that the four dioptries of corneal astigmatism really sufficed, as one can easily imagine that the pressure over the cornea, though not required to be at all especially strong for production of the four dioptries of corneal astigmatism, might still be strong enough to exercise an influence on the curvature proportions of the lens, and thus in the above-mentioned case to diminish the original astigmatism of the lens by one dioptry.

As the patient did not live at the place and could not present himself for further examination, the proportions, as intimated, could not be more definitely determined.

As before the iridectomy he had seen well,and only after this was obliged to resort to the manœuvre of pressing with the finger, it may be accepted with certainty that the astigmatism of the lens developed after the iridectomy and was a result of the operation.

The irregular precipitates on the anterior lens capsule can, in my opinion, be left entirely out of consideration as of causative moment. What on the contrary most probably may be thought of as explaining the present change in curvature is without doubt the circumstance that after the operation the zonula was drawn in with the healing and scarring process, and thereby at this point was dragged upwards.

A similar partial distortion of the zonula in a vertical direction must cause as result a flattening of the lens in the same direction—that is, an astigmatism with axis of greatest refraction horizontal.

Unfortunately, nothing could be observed, by transmitted light, through the upper part of the coloboma, of the edge of the lens or of the relations which obtained there.

It is certainly a rare occurrence that changes in the curvature of the lens should set in after an iridectomy, and in the foregoing case one could perhaps assume that the still unsubdued iridocyclitis should bear an essential part of the blame.

ON THE MOST SUITABLE METHOD OF RECORDING OPTOMETRIC EXAMINATIONS.

By Dr. HJ. SCHIÖTZ, Christiania.

Translated by Dr. J. B. McMahon, New York.

IT is under all circumstances a gain to be able to state the results of our investigations in short technical expressions. The advantage is still greater if a long explanatory text can be replaced by symbols or abbreviations of fixed meaning. In general it may be said the less to write the better; provided always that clearness is not sacrificed for brevity. That such technical abbreviations should prove a real assistance, however, they must, it is evident, be generally understood and recognized.

The forms now in use for recording the results of optometric examinations are essentially defective as regards brevity, and could, as I take it, be judiciously replaced by another.

Of these defects I would mention the following:

First comes the incessant repetition of "right eye, left eye, o. d. or o. s.," an evil trifling in itself, but one which admits of easy correction.

Further, in the case of astigmatism, we are obliged to affix the "cyl." to the number of the glass and to designate the position of the axis of the glass—vertical, horizontal, so many degrees to the right or left of the vertical, etc.

If we are to combine a spherical glass with a cylinder, not only must the symbol ⌒ be used to connect the numbers for the two glasses, but the position of the axis of the cylinder must yet be designated.

This is under all circumstances a roundabout method of

expression, and although its clumsiness makes itself less felt in the use of printed forms for ordering glasses, it fully asserts itself when we attempt to record the results of examinations in our case-books.

The excellent method long since proposed by Javal is free from all these disadvantages. It leaves nothing to be desired in the matter of brevity and clearness, and I have no doubt but that it will obtain the universal recognition merited by its manifold superiority. Whoever has but once made trial of it, will never again have recourse to the older methods.

Javal's notation is based on the following principles: A semicolon separates the report of the two eyes. For the right eye we look to the right of the semicolon; for the left eye, to the left of it. We must imagine that we have before us the glasses in their frame and are about to put them on; as the glasses are so viewed from behind, it is self-evident that the glasses for the right and left eyes will be found on the right and left respectively. For the position of the axis, the examiner figures to himself a circle divided vertically into two halves, the right provided with a scale of degrees, 0° at the upper end, 180° at the lower. The horizontal position is accordingly designated by 90°.

The greatest advantage of Javal's method lies in this, that in astigmatism it always gives the meridian of highest refraction only, and no other. The object aimed at is fully accomplished, as every one knows that a cylindrical glass exerts its greatest influence on the meridian at right angles to its axis. If now I wish to employ a convex cylinder to increase the refractive power of the least refracting meridian, the axis of the cylinder must evidently correspond with the meridian of maximum refraction; if, on the other hand, I wish to lessen by means of a concave cylinder, the refractive power of the meridian of maximum refraction, the axis of the lens must be at right angles to this meridian.

Let us take for example the following:

$$165° + 2 \; ; \; 30° - 2 \; ;$$

According to the ordinary mode of expression, it would have the following form:

O. S. + 2D. cyl.; axis of the glass 15° to the left of the vertical (glasses viewed frombehind).

O. d. — 2D. cyl.; axis of the glass 30° to the right of the vertical.

There is no need of discussion as to which of these expressions is the shorter and clearer.

In the above example, we have in the left eye to do with a simple hyperopic astigmatism, and in the right with a simple myopic astigmatism. In correcting astigmatism with a convex cylinder, the meridian of minimum refraction is made equal to that of greatest refractive power; in using a concave cylinder, the meridian of maximum refraction is made equal to that of least refractive power. *The eye has, therefore, in the first case, the refraction of its strongest meridian; in the latter case, of its weakest meridian.*

If for the complete correction of the optical error, a combination of a spherical with a cylindrical glass is needed, the expression takes the following form:

$$165° + 2 + 3\,;\ 15° - 2 - 4,$$

in which the third figure designates the spherical glass or, if you will, the refraction of the eye after correction of the astigmatism. In the ordinary form we would write as follows for the right eye:

O. d. — 4D. sph. ⌒ — 2D. cyl.; axis of the glass, etc.

In the case of simple emmetropia, we write as follows:

$$- -\,;\ - - -.$$

In simple hyperopia or myopia, we write:

$$- +3\,;\ - -4.$$

A prescription for spectacles accordingly takes a very simple form:

Spectacles: 150° + 3 — 1; — — 2.
Pupil. dist.: 6.2 *cm.*

Of course, the optician is to be instructed that the convex cylinder is to be arranged with its axis parallel to the designated meridian, the concave cylinder with its axis at right angles to it. He must further know that the third number indicates the spherical glass, and also that a number stand-

ing by itself likewise indicates a spherical glass. This last is self-evident, as the degree-marking and the cylindrical glass go together.

In order to meet the objection that the optician may not without further explanation understand the short prescription given above, I have had a prescription-blank prepared.

The division of the scale in the Javal-Schiötz ophthalmometer is the same as in Javal's optometer, so that after the completion of the examination, the meridian of maximum refraction can be read off and noted. By means of the ophthalmometer, we determine only the difference between the two principal meridians of the cornea, so that the question remains open whether a plus- or minus-cylinder is needed. On this ground, the symbol ± is placed in the record before the number which shows the degree of astigmatism in dioptries.

For illustration, I present a few records from my case-book:

1.

43.5 ; 43.2
20° ± 1.5 ; 165° ± 2
25° + 2 + 3 ; 165° + 2 − 3
$\frac{20}{20}$ $\frac{20}{20}$

2.

43.5 ; 42.8
0° ± 0.5 ; 0° ± 0.3
− − − ; − −
$\frac{20}{20}$ $\frac{20}{20}$

3.

40.9 ; 40.45
0° ± 3 ; 10° ± 3
8° − 3.5 − 2.5 ; 10° − 3.5 − 0.5
$\frac{20}{40}$ $\frac{20}{30}$

4.

45.0 ; 44.2
175 ± 0.5 ; 5° ± 1.4
− ÷ 5 ; 5° + 1 −
$\frac{20}{30}$ $\frac{20}{30}$

The figures of the first line show the focal distance of the cornea in dioptries; for example, those given in the last case (4), 45 ; 42.2, correspond to the radii 7.49 *mm.*; 7.63 *mm.*

In the second line we have the result of the ophthalmometric examination; in the third that of the optometric; and finally, in the fourth, the record of the visual acuteness.

In my opinion, a shorter or more comprehensive notation cannot be imagined. In conclusion, I cannot refrain from expressing the wish that it should be universally adopted.

ON THE DESIGNATION OF THE MERIDIAN IN THE DETERMINATION OF GLASSES AND OF THE VISUAL FIELD.

By H. KNAPP, New York.

Translated by Dr. J. B. McMahon, New York.

IT has long been my intention to urge upon my colleagues the advisability of doing away with the lack of uniformity prevailing in Europe in indicating meridians. The communication of Dr. Schiötz, which appears in this number, has induced me to supplement his proposals with some others, so that the simplest and most practical results may be arrived at by a discussion of the question in its varied aspects from different sides. As in Europe one places 0° at the upper end of the vertical meridian, another at the temporal end of the horizontal meridian, still a third at its nasal extremity, and again some count from right to left, others from left to right, it naturally becomes necessary for each one to state more or less circumstantially, by word or symbol, or both, just what he means. Some twelve years ago, H. D. Noyes drew the attention of a number of New York ophthalmologists to this confusion with a view to obtaining uniformity in the recording of the visual field, and all agreed to follow, for the designation of the meridians, the method employed by Helmholtz in his "Physiological Optics" in the study of the movements of the eye. This was to take as the zero point the left end of the horizontal meridian of each eye, and to count from left to right as the hands of a watch viewed by the person under examination move. 0° accordingly marks the temporal end of the

horizontal meridian of the left and the nasal end of the same meridian of the right eye; 180° marks the nasal end of the horizontal meridian of the left and the temporal end of the same meridian of the right eye.

This plan was followed, not only in prescribing glasses, but also in perimetric records; in the latter the scale extending to 359°, and again to 0°—*i. e.*, the left end of the horizontal meridian of each eye.

The method was soon universally adopted in all North America, so that it has long since been understood by opticians without explanatory word or symbol. The symbol ⌒, introduced by Donders, and the word axis, are also omitted by the majority as superfluous; for example, $+\frac{1}{18}$ $+\frac{1}{36}$ c 45° (or, in the metric system, + 2 + 1c 45°) means for the right as well as for the left eye $+\frac{1}{18}$ (spherical, Paris inches) combined with $+\frac{1}{36}$ cylindrical, axis 45° above the left extremity of the horizontal meridian. 135° would indicate a revolution of the radius 135° from the zero point, going from left to right, etc. This method of notation, borrowed from the great scientist, is at once simple and definite. The spherical glass is first indicated, and, as usual, without any special designation. It signifies in the great majority of cases the refractive error of that meridian which is nearest normal—viz., that of maximum refraction in hyperopia, and that of minimum refraction in myopia. If the axis of the cylindrical glass is placed parallel to this meridian, then the refraction of the other principal meridian, which is at right angles to it, is made equal to it. This notation is the most natural, and corresponds to the routine of testing the eye adopted by all ophthalmologists who employ trial glasses and the ophthalmoscope for this purpose.

Although this method has been in general use in America without opposition for years, I would, however, suggest another in prescribing cylindrical glasses. Our eyes, like our hands and feet, are symmetrical organs, which, applied to this special case, means that the principal meridians of a normally astigmatic pair of eyes have the same inclination to the median plane. If, for example, the upper extremity of the meridian of maximum refraction of one eye is in-

clined 10° toward the nose, the same is true of the other eye.

This statement holds more or less accurately for the great majority of cases of abnormal astigmatism. If my experience does not deceive me, those astigmatics experience the most relief and comfort in the use of cylindrical glasses in whom the glasses can be arranged symmetrically. This circumstance also serves me as a guide when in one eye the principal meridian can be definitely ascertained by a considerable gain in visual acuteness under the use of a cylindrical lens, whilst this is impossible in the other eye, on account of amblyopia of high degree or difficult of correction, or, which at least, can only be determined with the ophthalmoscope. Under such circumstances, I generally arrange the axis of the glass for this eye as nearly as possible to correspond with the other. In these examinations, a method which would directly show the presence or absence of symmetry of the two eyes, is very desirable. If, for example, I wish to record that the meridian of maximum refraction of each eye is inclined to the nose 10°, I would order a convex lens as follows:

$$\text{Left} + \tfrac{1}{18}{}^{c}\ 10^{\circ}{}_{n};\ \text{right} + \tfrac{1}{18}{}^{c}\ 10^{\circ}{}_{n};$$

A concave lens thus:

$$\text{Left} - \tfrac{1}{18}{}^{c}\ 80^{\circ}{}_{t};\ \text{right} - \tfrac{1}{18}{}^{c}\ 80^{\circ}{}_{t};$$

—viz., the upper extremity of the axis of the cylindrical glass is inclined to the temple 80° —. If one desires further brevity the symbols for cylinder and for degrees can be omitted, as the signs for nasal or temporal show clearly that we have to deal with a cylindrical glass with a definite position of the axis. The above examples can accordingly be written with equal clearness as follows:

$$\text{Left} + \tfrac{1}{18}\ 10^{n};\ \text{right} + \tfrac{1}{18}\ 10^{n}$$
$$\text{Left} - \tfrac{1}{18}\ 80^{t};\ \text{right} - \tfrac{1}{18}\ 80^{t}.$$

The last example would be written after the usual manner in America as follows:

$$\text{Left} - \tfrac{1}{18}\ 10^{\circ};\ \text{right} - \tfrac{1}{18}\ 170^{\circ};$$

from which the symmetry is not at once apparent, but is

easily recognized in observing that the one angle is the supplement of the other.

If a cylindrical glass is to be combined with a spherical, the number of the latter is written first.

I propose, therefore, *to record the meridians in perimetric examinations of the field of vision or of fixation after the method of Helmholtz*, because this is affected by the law of corresponding places in the retina; *but, in the recording of astigmatism, to use such a method as will directly show the symmetrical or asymmetrical position of the principal meridians.*

SYSTEMATIC REPORT ON THE PROGRESS OF OPHTHALMOLOGY DURING THE THIRD QUARTER OF THE YEAR 1885, AND ADDENDA.

By H. MAGNUS, Breslau; C. HORSTMANN, Berlin; and A. NIEDEN, Bochum.

WITH THE CO-OPERATION OF

C. E. Fitzgerald, Dublin; E. Marckwort, Antwerp; P. von Mittelstädt, Brussels; Dantone, Rome; Hirschmann, Charkow; S. M. Burnett, Washington; Schjötz and Ole Bull, Christiania, etc.

Translated by Dr. F. E. D'Oench, New York.

Sections I.–V. Reviewed by Prof. H. MAGNUS.

I.—GENERAL OPHTHALMOLOGICAL LITERATURE.

a.—TEXT-BOOKS, MONOGRAPHS, TREATISES ON GENERAL, BIBLIOGRAPHICAL, AND HISTORICAL SUBJECTS.

385. Emmert. Mesures anciennes et nouvelles. *Revue méd. de la Suisse Rom.*, Aug., 1885, No. 8.

386. Fox, L. Webster. Clinical observations. *Amer. Ophth. Soc.*, vol. xxi., July 15–16, annual meeting, 1885.

387. Königstein. Ophthalmic communications. *Wiener med. Presse*, 1885, Nos. 19, 21, 27. Contains remarks on ischæmia retinæ, uveal coloboma, monocular diplopia in incipient cataract, hemeralopia in icterus, muscular paralysis in acute lymphomatosis.

388. Kotelmann. The history of glasses. *Blätter f. Handel, Gewerbe, u. Sociales Leben*, 1885, Nos. 36–39. Kotelmann tries to prove that the ancients were not only familiar with the optical

properties of convex and concave glasses, but also made use of them for therapeutical purposes. Kotelmann's paper is prepared with great diligence and historical knowledge.

389. MAGNUS. Statistics of blindness. *Klin. Monatsbl. f. Augenhk.*, Aug., 1885, p. 357. Reports the causes of blindness of 316 persons at various institutions.

390. MOYNE. Il servicio oculistico nelle Ferrovie Romane. *Bull. d'ocul.*, vol. viii., 1, Sept., 1885. Among 4,335 members of the Ferrovie Romane 652 were found unfit for service, 47 of them on account of chronic inflammations of the eyes, 517 on account of imperfect vision, and 86 on account of imperfect color perception.

391. PIDERIT. Mimicry and physiognomy. Second revised edition. Detmold, 1886. Third chapter: Mimicry of the Eyes, pp. 43–82. Physiognomy of the Eyes, pp. 174–195. A very painstaking scientific presentation.

392. SCHWEIGGER. The connection between ophthalmology and other branches of medicine. Oration, delivered at the anniversary of the founding of the medico-military academies, Aug. 2, 1885. Treats of xerosis and blennorrhœa neonatorum and their etiological relations to micro-organisms, of antiseptics in ophthalmology, and of the interesting phenomena of optical delusions and their relations to learning to see. These subjects are presented in the lucid, impartial manner to which we are accustomed in Schweigger, and the pamphlet is therefore very interesting reading.

EMMERT (385) criticises the metric system very unfavorably; the greatest objection against it is that the dioptry gives only the focal power and not the focal length, so that a calculation always becomes necessary to find the latter. For practical daily use the metric system therefore presents more difficulties than the inch system.

FOX (386) operated on a woman sixty years old who had never seen before. She saw all objects after the operation (extraction), but could not name them until she had touched them. She recognized colors, but could not tell their names; red and black were disagreeable to her, while green and white produced an agreeable sensation. Her estimate of distances was at first very uncertain, so that she was diffident in her movements.

b.—STATISTICAL PAPERS.

393. ADLER. Twelfth report on the ophthalmic department of the hospital at Wieden and the St. Joseph's Hospital for Children. Report of the hospital at Wieden for 1884. Vienna, 1885.

394. A. T. BOGAJEWSKY. Short report on the eye-patients at the hospital at Krementschug for the year 1884. *Wjestnik ophth.*, July–Oct., 1885. 65 eye-patients, 4.89 % of the whole number of patients, 30 operations, among them 14 extractions.

395. SALTINI. Un settennio di clinica oculistica. Modena, 1885.

396. STEFFAN. Twenty-third annual report of Dr. Steffan's Ophthalmic Institute at Frankfort-on-the-Main. 1885.

ADLER (393) treated 2,773 new patients. Extractions according to Graefe, 8 ; 10 iridectomies for glaucoma. Adler urgently recommends the electrolytic treatment of permanent opacities of the cornea ; he has thus far treated twelve cases with very satisfactory results. It never had any injurious effect. The method is contra-indicated in total leucoma, and acute inflammations of the cornea, iris, and conjunctiva. The density and intensity of the corneal opacities were materially diminished. The twelve patients were treated in twenty-one sittings.

From 1877 to 1884 MANFREDI treated 8,205 eye-patients at his clinic in Modena (395). He performed 123 iridectomies for glaucoma, and 166 extractions (most of them according to Graefe, a few according to Liebreich), with 16 failures. After the introduction of antiseptics the failures were reduced from 9.63 % to 5.04 %.

DANTONE.

STEFFAN (396) treated 5,863 eye-patients and performed 467 operations, among them 19 peripheric extractions, 17 with good, 2 with moderate result.

II.—GENERAL PATHOLOGY, DIAGNOSIS, AND THERAPEUTICS.

a.—GENERAL PATHOLOGY AND DIAGNOSIS.

397. BUMM. The micro-organism of the gonorrhoic affection of mucous membranes, gonococcus Neisser. From examinations of women and the conjunctiva of new-born children.

398. CHIBRET. La question de la transplantation de l'œil. *Rev. génér. d'ophth.*, 1885, p. 385.

399. VON SCHULTÉN. Investigations on cerebral pressure, with special regard to its influence on the circulation of the eye. *Arch. f. klin. Chir.*, vol. xxxii., 4, Berlin, 1885.

According to BUMM (397) only those are cases of blennorrhœa neonatorum in which the presence of gonococci can be demonstrated ; when the latter are not found the case is simply one of

excessive catarrhal conjunctivitis, the secretion of which is not infectious. The behavior of the gonococci in the tissue of the conjunctiva is described by Bumm as follows :

A certain number of the micro-organisms enter the conjunctival sac with the infectious discharge. There the bacteria find a good soil in the fluid which is always present, so that they multiply rapidly. They penetrate between the outer layers of the epithelium, and also into the soft protoplasmatic substance of the latter, but they principally proliferate into the depth between the elements of the epithelium and thus finally reach the papillary body of the mucous membrane. The time required in this process varies, but as early as the second day the whole epithelium may be completely impregnated with diplococci. The bacteria always pass through the epithelium by going through the cementing substance. The reaction of the tissue is soon very energetic. Large numbers of white blood-corpuscles leave the distended net of capillaries reaching close to the epithelial layer, enter the outermost layers of the connective tissue, penetrate the epithelial layer, and thus reach the surface of the mucous membrane. The epithelium, the regularity and coherence of which has been disturbed by the proliferation of the cocci, is either separated into fibres by the pus-cells or at once detached in larger masses, according to the intensity of the current of liquid and cells, which process is assisted by frequent capillary hemorrhages between the epithelium and connective tissue and the friction of the tarsal portion of the lid on the globe. When a croupous membrane takes the place of the detached epithelium, the bacteria proliferate between the fibrinous reticulum and the lymphoid cells contained in it, arranging themselves in graceful heaps and rows. The proliferation of cocci ends suddenly at the epithelium of the corneal margin and edge of the lids. When once the epithelium of the conjunctiva has been destroyed, there is nothing to prevent the micro-organisms from penetrating into the papillary body. But their power seems broken, as they do not advance beyond the most superficial layers of the subepithelial tissue.

While the micro-organisms are proliferating in the outermost layers of the conjunctival tissue, the inflammation is still increasing ; the infiltration with round cells finally extends 2 *mm.* beneath the surface, and the cells are packed one against the other. On the fourth day at the earliest, regeneration begins from the remnants of the epithelium, which rapidly advances and soon

puts an end to the farther spread of the cocci. The new epithelium consists at first of a layer of cubical or elongated, rapidly proliferating elements, which very soon are covered with two or three layers of flatter cells with spindle-shaped processes. The latter overlap and thus furnish a protection for the parts underneath; the outermost, oldest epithelial cells lose their nuclei and are converted into perfect lamellæ of epidermis, which form an impenetrable barrier against the micro-organisms. The escape of the pus-cells continues unchecked during the formation of new epithelium, without, as a rule, affecting the regular arrangement of the latter.

The regeneration of the epithelium is always associated with processes of proliferation, multiform, solid cones growing from the lowest layer of cells into the substratum of connective tissue. This process attains its fullest development on about the tenth or twelfth day, and sections made at this time very much resemble the zone of proliferation of a cancer. At this time the gonococci have disappeared from the papillary body, and only in the outermost layers of the epithelium some rows and aggregations may still be found. When, however, the newly-formed epithelium cannot resist the force of the round cells passing through it, so that it is torn apart as in the beginning of the affection, the cocci may again invade the lower strata. Such relapses may retard the final regeneration of the epithelium, but, as a rule, the process of repair is completed in new-born children in the third week of the disease. The whole conjunctiva is then covered with epithelium which has all the characteristics of pavement-epithelium arranged in layers, and retains them until the swelling and proliferation of the papillary body have disappeared.

CHIBRET (398) tries to justify his attempt to transplant the eye of a rabbit to man. The pain which manifested itself in the eye after his first paper had been published led Chibret himself to think of the possible development of sympathetic ophthalmia. For this reason Chibret will make no more experiments on man, but advises to study the question in animals. MARCKWORT.

SCHULTEN (399) has found the following: Extradural limitation of the cranial cavity produces the following results: The retinal arteries contract, while the veins dilate; the fundus of the excavation is pushed forward; the choroidal blood-vessels are not perceptibly affected. These changes are observed when the limitation does not exceed 5–6 % of the cubic contents of the cranial

cavity, and before other marked symptoms of general cerebral pressure appear. When the limitation is increased to 10 %, convulsions and cessation of respiration usually are the consequence. The effects of a limitation of 5–6 % upon the eye have usually disappeared the next day, although the limitation of the cranial cavity continues. Restriction of the subdural space has similar effects upon the eye, but it seems that it must be larger to produce them. Both eyes are always affected. The intraocular pressure is only slightly affected by pressure acting upon the dura mater from outside.

b.—GENERAL THERAPEUTICS.

400. BETTREMIEUX. L'énucléation du globe oculaire avec lavages antiseptiques, sutures, et drainage. *Arch. d'ophth.*, vol. v., 4, July–Aug., 1885.

401. BIRNBACHER. The application of sterilization by heat to the aseptic treatment of the eye. *Centralbl. f. prakt. Augenhk.*, Aug., 1885.

402. LANDESBERG. The rehabilitation of the seton in ophthalmic practice. *Centralbl. f. prakt. Augenhk.*, July, 1885.

403. OETTINGER. The artificial ripening of cataract. Inaug. Diss., Breslau, 1885.

404. PAPE. The present status of the question of antiseptics in ophthalmology. Inaug. Diss., Breslau, 1885. A critical presentation of the most important features in the introduction and development of antiseptics in ophthalmology.

According to BETTREMIEUX, PANAS (400) introduces a drainage-tube after enucleation into Tenon's capsule, and fastens it in the outer angle. The conjunctival wound is sutured. In special cases, for instance, when an eye with panophthalmitis is removed, a loop is passed through the conjunctiva at the upper and lower margin of the cornea, by means of which the whole of Tenon's space can be exposed after enucleation, so that it can be washed out with an antiseptic solution, consisting of aq. 1,000, alcohol 20, and hydrarg. bijodat. 0.05. Panas thinks that this ensures perfect safety against orbital phlegmon and meningo-encephalitis. In a case of panophthalmitis the healing after enucleation was smooth and rapid. v. MITTELSTÄDT.

BIRNBACHER (401) exposes all the materials for bandaging before the operation, to a heat of 150–160° C. in a tightly closed tin box in a drying-oven for two hours. The glass tray for the

instruments is treated in the same manner. All the instruments, with the exception of those with a cutting edge, are brought to a glow in the flame of a Bunsen burner before being used. The water is repeatedly boiled. The cutting instruments are placed for an hour in absolute alcohol.

LANDESBERG (402) declares that in certain diseases of the eye the seton is a remedy which cannot be dispensed with. It proved efficacious in serous affections of the uveal tract, in idiopathic inflammations of the optic nerve and retina, in genuine atrophy of the optic nerve, and certain forms of diffuse keratitis in adults which are not due to syphilis.

According to OETTINGER (403) the massage of immature cataracts is particularly indicated when the nucleus of the lens has become opaque. The opaque nucleus acts as a firm base upon which the cortical masses can be thoroughly crushed. This part may also be played by an opacity at the posterior pole, provided it is extensive enough. The zonula must be intact and the pupil wide, otherwise massage must not be attempted.

III.—INSTRUMENTS AND REMEDIES.

a.—INSTRUMENTS AND TECHNICAL CONTRIVANCES.

405. ANDREWS. A new instrument for washing the upper cul-de-sac of the conjunctiva. *Med. Rec.*, Aug. 29, 1885.

406. IMBERT. Théories des ophthalmotonomètres. *Arch. d'ophth.*, vol. v., 4.

407. PFLÜGER. The isophanochromatic rings for the quantitative determination of the color-sense and the black rings for the quantitative determination of the light-sense. Bern, 1885.

408. TREITEL. Plates for the numerical determination of the light-sense. Königsberg, 1885.

409. UHTHOFF. Contrivance for determining the angle α or γ respectively between the line of sight and the perpendicular erected upon the centre of the cornea. *Arch. f. Anat. u. Physiol.*, physiol. Abth., vols. iii. and iv., 1885.

TREITEL (408) has placed various shades of gray on a black background, and uses these plates for the determination of the slightest differences of illumination. A normal eye can recognize in ordinary daylight a shade of gray composed of 3° white and 357° black. This represents about the physiological limit, which is probably never exceeded and which we may therefore assume as

the unit, L = 1. L = $\frac{1}{2}$, when the darkest shade of gray recognized is composed of 6° white and 354° black, etc. There are in all 11 plates, by means of which the light-sense between 1 and $\frac{1}{110}$ can be measured. They can be easily handled and deserve more general attention.

b.—REMEDIES.

410. ALLPORT. Peroxide of hydrogen. *Amer. Journ. Ophth.*, vol. ii., 5 and 6.

411. CICARDI. Sul jodoformio nella terapia oculare.

412. EMMERT. Sublimate in ophthalmology. *Deutsche med. Wochenschr.*, No. 34.

ALLPORT (410) recommends the peroxide of hydrogen in purulent ophthalmias and particularly in purulent inflammation of the lachrymal sac.

IV.—ANATOMY.

a.—GENERAL ANATOMY.

413. CARRIÈRE. The comparative anatomy of the visual organs of animals. Munich and Leipzig, 1885. With 147 illustrations and one plate. An excellent presentation of the comparative anatomy of the eye. The author discusses this difficult subject in a concise and critical manner. He has also touched occasionally on the physiology of the subject, and his accurate, clear, statements will probably do away with the confused conception of Marty, Grant Allen, and others, in regard to the color-sense of animals.

414. REAL Y BEYRO. Contribution à l'étude d'embryologie de l' œil (suite). *Rec. d'ophth.*, July–August, 1885.

415. SCHLEICH. The fundus of the rabbit and the frog as an aid in teaching the use of the ophthalmoscope. *Mitth. a. d. ophth. Klin. in Tübingen*, vol. ii., No. 2. Tübingen, 1885.

416. SCHWALBE. Text-book of the anatomy of the organs of sense. First number. Second number, first half. Erlangen, 1885.

REAL Y BEYRO (414) continues the report of his studies begun in the June number of the *Rec.* on the development of individual parts of the eye, and sums up his results as follows: (1) The membrana capsulo-pupillaris is only one portion of the embryonic network of blood-vessels of the vitreous, and develops simultaneously with the lens; (2) the retinal blood-vessels do not come from those of the vitreous, for as soon as the latter have

disappeared we see the former spring from the central blood-vessels ; (3) the zonula Zinnii and hyaloid membrane are formed by differentiation from the hyaline substance of the vitreous ; both appear late ; (4) the pecten of birds is homologous to the reticulum of blood-vessels of the vitreous of mammals ; at its beginning it is not covered by the hyaloid membrane ; (5) there is neither a pupillary membrane in birds nor a capsule of blood-vessels of the lens. V. MITTELSTÄDT.

SCHWALBE (416) has prepared an excellent text-book of the anatomy of the eye, which we earnestly recommend. It is based on studies of his own and a thorough utilization of the literature of the subject, and contains a number of very instructive illustrations.

b.—RETINA, UVEAL TRACT.

417. BOÉ. Quelques recherches sur la couche pigmentaire de l'iris et sur le soi-disant muscle dilatateur de la pupille. *Arch. d'ophth.*, July–August, 1885.

418. EVERSBUSCH. Comparative studies of the minuter structure of the iris of mammals. Second communication. The muscles of the iris. With subsequent remarks. *Zeitschr. f. vergleich. Augenheilk.*, vol. iii., pp. 33 and 145.

419. HIRSCHBERG. Case of præpapillary loop of the central retinal artery. *Centralbl. f. prakt. Augenhk.*, July, 1885. A very characteristic case of this very rare anomaly in which loops of blood-vessels penetrate into the vitreous from the papilla. In some mammals this is the rule.

420. OLSHAUSEN. Entoptic examination of a central scotoma due to dazzling, with some anatomical and physiological observations and reflections on the macula lutea. Inaug. Diss., Halle, 1885.

421. SCHLEICH. Examinations of the size of the blind spot and its relations to the point of fixation. *Mitth. a. d. ophth. Klin. in Tübingen*, vol. ii., No. 2. Tübingen, 1885.

BOÉ (417) concludes from his investigations as follows : 1. The pigment-layer of the iris is composed of two secondary layers ; it contains two rows of nuclei, both of them covered with pigment-granules ; (2) of these two layers the anterior one corresponds to the outer, the posterior one to the inner leaf of the secondary ocular vesicle, as already found by Schwalbe ; (3) Henle's dilator

does not exist, for the nuclei, which this author considers nuclei of smooth muscular fibres, belong to the anterior row of pigment-cells; (4) the inner layer of the pars ciliaris retinæ contains no pigment; as it advances over the iris it gradually becomes pigmented, and he found that (*a*) in adults the pigment completely hides the nuclei at the insertion of the iris; (*b*) that in a child four years old this inner row of nuclei can be traced to the pupillary margin, though concealed more and more under pigment; (*c*) that in a fœtus six months old it extends for a long distance over the posterior surface of the iris, before being covered with pigment; (*d*) that in barleus fluv. this arrangement is the same as in the human fœtus. v. MITTELSTÄDT.

c.—REFRACTIVE MEDIA AND MUSCLES.

422. MOTAIS. Recherches sur l'anatomie humaine et l'anatomie de l'appareil moteur de l'œil (suite). *Arch d'ophth.*, vol. v., 5, Sept.–Oct., 1885.

423. RUDBATEL. Recherches sur le développement du cristallin chez l'homme et quelques animaux inférieurs. Inaug. Diss., Geneva, 1885.

424. H. VIRCHOW. On blood-vessels of the vitreous of cyprinoids. On cells of the vitreous. *Verhandl. d. physiol. Gesellsch. zu Berlin*, Sitzung v., 15 Mai u. 5 Juni, 1885.

MOTAIS (422) describes Tenon's capsule in man at length, and also the systems of fascias in the orbit. He also gives directions how these parts may be prepared in an easy and instructive manner. v. MITTELSTÄDT.

RUDBATEL (423) comes to the following conclusions: The capsule of the lens is derived from the mesoblast, and, therefore, is connective tissue. The lens-star consists in the embryo of intercellular substance; the axis of the star passes directly into the homonymous posterior zone. In adults the lens-star consists only of a linear suture, and the posterior zone and the intercellular substance of the lens-star disappear in proportion to the growth of the lens.

H. VIRCHOW (424) shows that in cyprinoids the hyaloid artery enters at the papilla and spreads over the surface of the vitreous; the vein, on the contrary, is an annular blood-vessel at the ora serrata, and leaves the vitreous at the lowest point of the ciliary body.

V.—PHYSIOLOGY.

a.—FROM VARIOUS DEPARTMENTS.

425. BRUNO KOLBE (St. Petersburg). The influence of the brightness and color of the paper on visual acuteness. *Wjestnik ophth.*, July–Oct., 1885, pp. 289–296.

426. MOELI. Remarks on the reaction of the pupils. *Berlin. Gezellsch. f. Psych. Centralbl. f. prakt. Augenhk.*, 1885, p. 272.

KOLBE (425) finds that the color of the background (when not very decided) has no material influence on the acuteness of vision. The more intense the after-images are produced by the colored background, the more rapidly the eyes become tired. A red or green background acts more quickly in this respect than a blue or yellow, and these more quickly than a gray or white of the same intensity. The author therefore favors white paper and clear black type.

Among five hundred paralytics MOELI (426) found in 47 % no reaction of the pupils to light, in 4 % it was doubtful, in 10 % very slight; in 1 % there was paralysis of accommodation. The immobility of the pupils is a very important somatic symptom, more important than difference in size.

b.—PERCEPTION OF COLOR.

427. DOR. Un cas de chromatotyphlose ou achromatopsie complète. *Rev. génér. d'ophth.*, Oct., 1885.

428. JEFFRIES. Standard color signals. *Med. News.* Amer. Ophth. Soc., July 15–16, 1885.

429. KOLBE. The comparableness of the pigment-colors. *Centralbl. f. prakt. Augenhk.*, July, 1885.

430. NICHOLS. On the sensitiveness of the eye to colors of a low degree of saturation. *Amer. Jour. of Science*, July, 1885.

DOR (427) had opportunity to examine an intelligent perfectly color-blind gentleman, and reports at length the interesting results of the various methods of examination. The samples of worsted were arranged without the usual mistakes. As the results of the other methods cannot be epitomized, mention may only be made that the plates of Ole Bull seemed to present the greatest difficulties. The first five rows seemed alike to him; in the sixth and seventh rows he thought the yellow samples were the darkest. The patient had Am. 2.75 in both eyes, and there was a high degree of convergent strabismus in the left eye. V in both = $\frac{10}{10}$.

No ophthalmoscopic changes. The color-sense of the parents and three other children is normal, while a brother is also completely color-blind. MARCKWORT.

KOLBE (429) calls attention to the fact that the determination of the chromatic value of the pigment-colors may sometimes be a valuable supplement to the quantitative examination of the color-sense.

NICHOLS (430) mixes colored powders with white in order to determine the lowest point at which a sensation of color may still be perceived. He finds that the colors range themselves in the following order. There were required :

	Red.	Yellow.	Green.	Blue.
In 31 men :	15.9 parts.	17.3 parts.	817.7 parts.	148.5 parts.
" 23 women :	59.8 "	33.2 "	913.6 "	108.1 "

Sections VI.–XI. reviewed by DR. HORSTMANN.

VI.—ANOMALIES OF REFRACTION AND ACCOMMODATION.

431. DRANSART. Guérison de la myopie progressive par l'iridectomie et la sclerotomie. *Ann. d'ocul.*, 1885, vol. xciv., p. 109.

432. GIRAUD-TEULON. Recherches cliniques sur l'hypermétropie. *France méd.*, 1885, p. 1420.

433. HARLAN. Rapidly progressive myopia permanently checked by section of external rectus. *Med. News.* Amer. Ophth. Soc., 1885.

434. RANDALL, A. The refraction of the human eye. A critical study of the statistics obtained by examination of the refraction, especially among school-children. *Amer. Journ. Med. Sci.*, July, 1885, p. 123.

435. SALTINI. Cefalometria dioptometria. Modena, Aug., 1885.

436. ULRICH, RICHARD. Investigations on the connection between convergence and acquired myopia. *Zeh. klin. Monatsbl. f. Augenhk.*, vol. xxiii., p. 433.

437. WEISS, L. On the reflex-crescent visible at the inner side of the papilla, and its relation to beginning myopia. *v. Graefe's Arch. f. Ophth.*, vol. xxxi., 3., p. 239.

In severe cases of progressive myopia, DRANSART (431) performs an iridectomy or sclerotomy, acting on the supposition that

the primary cause of glaucoma as well as of progressive myopia is an increase of the intra-ocular tension; the difference between these two diseases he thinks lies in the different power of resistance of the membranes. Dransart operates on only those cases of progressive myopia in which V has declined to $\frac{1}{4}$, and the decline can be shown to continue. Dransart has performed iridectomy or sclerotomy in twenty cases of this kind, and supplemented this treatment with injections of pilocarpine and mercurial inunctions; in only one case there was no improvement. Several clinical histories. MARCKWORT.

GIRAUD-TEULON (432) has published a very interesting paper on hypermetropia. According to him latent H. becomes manifest between the ages of forty-five and fifty-two. Among 727 cases of asthenopia accommodativa of school-children with H. he found 532, *i. e.*, 63 % of anæmia and adynamia.

HARLAN (433) divided the external rectus seven years ago in a boy of sixteen, whose myopia had suddenly increased. Since then it had remained stationary.

Based on a large number of publications on the refraction of the eyes in childhood, RANDALL (434) asserts that at that age myopia is almost unknown and does not develop until the children go to school. Then it increases from class to class. Hypermetropia is the refractive condition in the great majority of smaller and larger children; outside the school it predominates, and is diminished by changing to myopia. Emmetropia in the mathematical sense scarcely ever occurs. BURNETT.

SALTINI (435) has measured the cranial index (the ratio between length and breadth) of 157 myopes, 238 emmetropes, and 64 hypermetropes. The results were similar to those obtained by Bono, but not so well defined. In myopes the usual index was 80; in emmetropes, 82; in hypermetropes, 83; the averages in the same order were 81, 82, 83 (Bono's numbers were 81, 82, 87). In general, 15.88 % of the myopes had a dolichocephalous skull, 27.28 % a mesatocephalous, and 56.68 % a brachycephalous skull. In the emmetropes the analogous percentages were 9.89, 18.37, and 71.73; in the hypermetropes, 9.37, 14.06, and 76.56. The average of the longitudinal diameter in myopes was 184 *mm.*, in emmetropes, 182 *mm.*, and in hypermetropes, 180 *mm.* (measured from the limits of the soft tissues). In spite of these numbers, however, the author is not willing to draw any conclusions as to the dependence of the refraction on the cranial index, and thinks

that as the result of further measurements the numbers will approximate more closely. DANTONE.

In 1882 A. Hoffmann examined the eyes of the scholars of the Strassburg Lyceum, not only as to their refraction, but also as to their muscular balance (*v.* vol. xiv., Rev. No. 267, p. 327), and published them in his dissertation. Three years later ULRICH (436) had opportunity to examine once more 273 of these scholars. In 120 the refraction had increased, among them 71 myopes ; 36 emmetropes had become myopic, and 13 hypermetropes emmetropic, or less hypermetropic. He also found that when emmetropia changes to myopia, the change begins early, about in the twelfth year, and that in older persons the myopia is more liable to remain stationary. Hereditary disposition plays an important part in the conversion of emmetropia into myopia ; the power of convergence is greater in persons with stationary emmetropia than in those whose myopia has resulted from emmetropia.

WEISS (437) found both in adults and children in the posterior portion of the vitreous chamber a reflex crescent which was most plainly seen in the upright image when the adjustment was for a certain plane ; when this was the plane of the retina, the streak became indistinct or was not visible at all. There was a difference of 1-3 D. and more between the glass required to view the details of the fundus and that necessary to see the reflex-crescent. This difference increased with the degree of myopia and with it the distance of the crescent from the papilla. As a rule there were found in the eyes which presented this phenomenon, those changes at the entrance of the optic nerve which are generally assumed as characteristic of the myopic eye, but which are also found in emmetropic and hypermetropic eyes, as soon as their refraction is increased by lengthening the axis. The reflex-crescent indicates that the eye has begun to bulge at the posterior pole, and is therefore the most marked ophthalmoscopic symptom of the development of myopia. Weiss found the crescent in 38 % of 1094 eyes examined, 20.6 % of whom were hypermetropes, 32.6 % emmetropes, and 68.4 % myopes. In 83.6 % it was associated with other changes at the entrance of the optic nerve, in 13.7 % these were wanting. The crescent probably bears some relation to the detachment of the vitreous at the posterior pole of the eye, commonly found in myopic eyes, and the collection of liquid in front of the papilla. The conditions for a strong reflection of light are most favorable at the boundary be-

tween two optically different media, provided the curvature of the reflecting surfaces is suitable. This reflection, which depends upon the extent of the detachment of the vitreous and the meniscus of liquid, will assume the shape of an arc, at the inner edge of the papilla and fading away above and below, just as it is seen in reality. As the sagittal diameter of the eyeball, and with it the detachment of the retina, increases with the degree of myopia, the point most favorable for reflection will move forward, and with it the reflex crescent. When the detachment of the vitreous has reached a certain limit, the boundary line becomes more level and the reflected streak disappears.

VII.—LIDS.

438. BRANCHU. De la transplantation du sol ciliaire dans le trichiasis et l'entropion. *Thèse de Paris*, 1885.

439. BRUGGER, R. The operation of congenital and acquired blepharoptosis. *Aerztl. Intelligenzbl.*, 1885, No. 46.

440. DEPONTOT. Luxation de la paupière supérieure en arrière du globe. *Four. de méd. et de chir.*, 1885, p. 114.

441. DERBY, R. H. Ectropion of both lids; blepharoplasty by the Italian method. *Med. News*, 1885. Amer. Oph. Soc.

442. DESSAUER. Cystoid dilatation of the enlarged and multiplied convoluted sweat-glands under the clinical picture of xanthelasma palpebrarum. *v. Graefe's Arch. f. Ophth.*, vol. xxxi., 3, p. 87.

443. DUJARDIN. Quelques anomalies congénitales de l'œil. *Fourn. des sci. méd. de Lille*, 1885, p. 656. Congenital tumor of the upper lid.

444. JEFFRIES, J. Plastic operations without pedicle. *Med. News*, 1885. Amer. Ophth. Soc.

445. MATHEWSON, A. Case of epithelioma of eyelid removed by application of benzole and calomel. *Med. News*, 1885. Amer. Ophth. Soc.

446. SENTEX, L. Kyste dermoide du sourcil. Exstirpation. Erysipèle spontané. *Fourn. de méd. de Bordeaux*, July, 1885.

447. SALOMON, J. V. Clinical notes on tarsal tumor. *The Lancet*, 1885, vol. ii., p. 6.

448. SALOMON, J. V. Chancre of the eyelid in infants. *Brit. Med. Fourn.*, 1885, vol. ii., p. 62.

449. STELLWAG VON CARION. Entropium and ectropium of the lids. *Neue Abhandl. a. d. Gebiete d. Augenhk.*, Vienna, 1886, p. 1.

450. WARLOMONT. De l'emploi du cautère actuel et du thermo-cautère dans le traitement de l' entropion et du trichiasis. *Ann. d'ocul.*, 1885, vol. xciv., p. 5.

BRANCHU (438) recommends Dianoux's method against trichiasis and entropium (*v. Ann. d'ocul.*, vol. lxxxviii., p. 132). Ten cases. MARCKWORT.

BRUGGER (439) reports on the operation recommended by Eversbusch for congenital and acquired blepharoptosis. The present method differs from a real advancement of the levator palpebrarum sup., inasmuch as the insertion is not divided and advanced, but is drawn forward and downward towards the orbicularis muscle by three double sutures.

DEPONTOT (440) reports on dislocation of the upper lid behind the globe, which had resulted from the patient's blowing his nose. It was easily returned into position. MARCKWORT.

DERBY (441) reports a case of ectropium of both lids, caused by cicatricial contraction after an extensive burn over the entire right side of the face. The skin graft was dissected from the arm of that side, and applied to the wound according to the old Italian method, the arm being held in position by a firm waterglass-bandage. The flap took hold, and five months later the eye could be covered by the lids. BURNETT.

DESSAUER (442) made an anatomical examination of the skin of the upper lid in two cases, which presented the clinical picture of the xanthelasma palpebrarum. He found nothing abnormal, except a marked increase of the sweat-glands. They were connected with cysts which were found in all the layers of the cutis.

JEFFRIES (444) suggests that the prepuce of infants removed by the rite of circumcision be used in plastic operations without a pedicle. BURNETT.

In MATHEWSON'S (445) case calomel was first dusted upon the raw surface of the tumor, and afterwards benzole brushed over it. It disappeared in three months. BURNETT.

In a case of SENTEX (446), death from erysipelas followed the removal of a dermoid cyst. MARCKWORT.

After discussing the anatomical and physiological conditions of the lids, STELLWAG (449) describes the entropium of the lids when the eyeball has shrunken or is absent, the organic entropium.

This condition is overcome by the introduction of an artificial eye of the proper size. The senile spastic entropium is cured by oblique blepharotomy, or Snellen's suture operation. In symblepharon of greater extent, the transplantation of mucous membrane is indicated. For the cure of trichiasis and distichiasis, he recommends a partial plastic operation of the edge of the lid, or the removal of all the lashes with their roots. In distichiasis, a transposition of the eyelashes is still more indicated, as devised by Jaesche-Arlt. All these operations are insufficient, if the cicatricial contraction has distorted the other parts of the lids, or action of the muscles has produced genuine entropium; then Snellen's operation is indicated. In ectropium, Snellen's suture-operation should be performed, and in more severe cases Walter-Graefe's tarsoraphy. The acute ectropium which frequently accompanies inflammations of the conjunctiva in children, does not demand surgical treatment. In old paralytic ectropium, Arlt's medial tarsoraphy should be performed.

WARLOMONT (450) discusses at length former papers on the treatment of entropium with the glowing iron passed parallel or perpendicular to the edge of the lid. From experiments of his own, Warlomont, concludes that spastic entropium, especially of the lower lid, may be cured by this method, but that in more severe cases the result is uncertain. When the tarsus has become curved, it should be straightened, according to Streatfeild, after previous cauterization. According to Warlomont the only reliable method of operating for entropium is the one described by him in the *Ann. d'ocul.*, vol. lxxi., p. 221. MARCKWORT.

VIII.—LACHRYMAL APPARATUS.

451. ANNUSKE. The treatment of affections of the lachrymal canal with irrigations. *v. Graefe's Arch. f. Ophth.*, vol. xxxi, 3, p. 149.

452. BADAL. Exstirpation de la glande lacrymale en totalité: portion orbitaire et portion palpebrale. Considérations anatomiques et physiologiques. *Arch. d'ophth.*, 1885, vol. v., 5, p. 386.

453. WIDMARK, J. Bakteriologiske Studier ofver dacryocystit, hypopyonkeratit, blefaradenit och flegmonos dacryocystit. *Higiea*, 1885.

In ANNUSKE's (451) eight cases a cure was effected after a longer or shorter period of time; in eight other cases no definite result was obtained.

BADAL (452) derives from an unsuccessful extirpation of the lachrymal gland—in a case of ectropium and pannus—the following conclusions: The orbital portion of the lachrymal gland is completely separated from the palpebral portion by a fibrous capsule, and can be removed easily and without danger. (2) The removal of the whole palpebral or accessory portion, however, is very difficult, as the lobules lie scattered about in the depth of the lid. (3) The loss of the orbital portion has no effect on the moistening of the eye and only renders incapable of shedding tears. (4) The palpebral gland keeps the eye moist and is not excited by the influence mentioned. (5) The efferent ducts of both portions are more numerous, in some persons at least, than modern investigators assume. In the corpse they can be demonstrated only with difficulty; in the case in question, in which their openings lay exposed and could be readily recognized by the tears oozing from them, fifteen at least were counted. V. MITTELSTÄDT.

WIDMARK (453) found during his investigations four kinds of microbes: staphylococcus pyogenes albus and aureus, streptococcus pyogenes, and a bacillus. All of these produce hypopyon-keratitis when inoculated into the cornea of the rabbit. This affection has a striking resemblance to serpent ulcer, but the whole cornea is not destroyed. The author has examined seventeen cases of blepharadenitis, and twelve of phlegmonous dacryocystitis. In the former he found staph. pyog. aur. and alb. in the little abscesses at the roots of the eyelashes, in the latter almost exclusively streptococcus pyogenes. This agrees with the investigations of Ogston and Rosenbach. Staph. aur. and albus produced circumscribed abscesses as in blepharadenitis, while streptococcus pyogenes causes phlegmonous inflammation, as in dacryocystitis phlegmonosa. O. B. BULL.

IX.—MUSCLES AND NERVES.

454. ABADIE, CH. De l'asthénopie nerveuse. *Ann. d'ocul.* 1885, vol. xciv., p. 23.

455. COMBY. Quelques cas de zona chez les enfants. *France méd.*, 1885, p. 821.

456. DERBY, H. Two cases of penetration of the eyeball by scissors during the operation. *Med. News.* 1885. Amer. Ophth. Soc.

457. LANDOLT, E. De la ténotomie de l'oblique inférieur. *Arch. d'ophth.*, 1885, vol. v., 5, p. 402.

458. MANZ. Case of periodic paralysis of the oculomotor nerve. *Berl. klin. Wochenschr*, 1885, No. 40.

459. SEELY, W. W. The treatment of strabismus internus. *Med. News*, 1885. Amer. Ophth. Soc.

ABADIE (460) designates as nervous asthenopia a nervous irritable condition of the eye which closely resembles accommodative asthenopia, but differs from it inasmuch as vision does not become indistinct. The ciliary muscle acts, but its action is painful. Even when the eyes do not fix, there is no cessation of the complaints, consisting in headache, photophobia and a dull pain over the eyes. The disease is more frequently found in women who are affected with other nervous troubles. As therapeutic agents, Abadie recommends: bromide of potash, the constant current, hydrotherapeutics, metallo-therapeutics, and superficial atomizing of chloride of methyl according to Debore. MARCKWORT.

COMBY (455) reports five cases of herpes zoster ophthalmicus in children; their age was eight months, twenty-one months, and in three cases ten years. According to Comby this disease occurs in children more frequently than is generally supposed, and in contrast with its occurrence in adults is marked by its benignity; it is frequently associated with disturbances of digestion or is their direct result. MARCKWORT.

LANDOLT (457) divides the inferior oblique muscle at its bony insertion. This is found about where a perpendicular dropped from the incisura supra-orbitalis strikes the edge of the floor of the orbit. An incision is made to the orbital margin, where the muscle will be recognized by its color and arrangement of its fibres, after the bleeding has been stopped. It is seized with a forceps or hook and detached from its insertion with the knife or scissors. After that a suture is passed through the skin. The operation may be performed in paralysis of the superior oblique or in optic iridectomy upward, in which latter case, besides the tenotomy of the superior rectus, an advancement of the antagonist should be performed.

MANZ (458) observed in a young merchant total paralysis of the oculomotor nerve, which had been occurring every 4–6 weeks for fifteen years after an abstraction of blood, and then again disappeared. He does not express an opinion as yet to the cause.

SEELY (459) concludes that in cases of squint routine operative interference is wrong, since a thorough correction of a deviation in young children is extremely liable to be followed by an oppo-

site squint in after life. He considers that a large percentage of squints can be corrected by glasses alone, and that operations later in life offer better results. BURNETT.

X.—ORBIT AND NEIGHBORING CAVITIES.

460. BULL, C. S. Abscess of both frontal sinuses. Amer. Ophth. Soc., 1885.

461. BULLER, Fr. Melanotic fibro-sarcoma of the orbit removed ten years after enucleation of the eyeball. *Amer. Jour. Ophth.*, May–June, 1885. Report of a case.

462. DE LAPERSONNE. Phlébite suppurée des veines ophthalmiques et des sinus caverneux. *Arch. d'ophth.*, 1885, vol. v., 5, p. 436.

463. DE VINCENTIIS. Mucocele ed ectasia del labirintho dell' osso etmoide. *Ann. di ottalm.*, 1885, vol. xiv., 4.

464. FRYER. Bony tumor of the orbit. Amer. Ophth. Soc., 1885.

465. LABOURET. Contribution à l'étude des dermoides de l'œil. *Thèse de Paris*, 1885.

BULL (460) reports the case of a patient fifty-three years of age, who was struck on the bridge of the nose fourteen years before. About four years ago a swelling appeared at the upper inner angle of the right orbit, until finally the eye was closed by the swelling and ptosis. An incision was made just beneath the orbital arch, and an immense cavity containing a quantity of fetid pus exposed. The cavity was washed out with a 5 % carbolic acid solution and a complete healing effected in six weeks.

BURNETT.

DE LAPERSONNE (462) reports one case of his own and three observed by others of purulent phlebitis of the ophthalmic vein (in three cases autopsy), which proves that septic affections of the mouth, pharynx, and nasal cavities, also diseases of the bone, may give rise to these severe troubles. In de Lapersonne's case a phlegmonous angina with a gangrenous abscess of the tonsil was the cause. Very likely the veins of the fossa pterygo-palatina form the channels for the thrombosis of the orbit. The most constant and sometimes first symptom of thrombosis is the exophthalmus, which soon appears on the other side also. Ophthalmoscopically very marked choked disc. Death from purulent meningitis generally ensues between the eighth and twelfth day after the beginning of the exophthalmus. MITTELSTÄDT.

De Vincentiis (463) describes a case of exophthalmus with venous engorgement in the fundus, due to a mucous cyst in the labyrinth of the ethmoid bone. It was successfully removed through an incision above the inner canthus. Dantone.

In Fryer's (464) case, a boy received a blow on the forehead six years before. A tumor began to develop at once on the ridge of the left orbit, and had a consistency harder than cartilage and softer than bone. When it was removed a cyst was found containing a piece of wood enclosed in bone. Burnett.

Labouret (465) reports five cases of congenital orbital cysts; with regard to their pathogeny he agrees with Van Duyse (*cfr. Ann. d'ocul.* Sept.–Oct., 1881). Marckwort.

XI.—CONJUNCTIVA, CORNEA, SCLEROTIC, ANTERIOR CHAMBER.

466. Böckmann, Ed. Operation for pterygium. *Med. Rev.*, Sept., 1885. Bergen.

467. Darrigade, P. Du pterygion et de son traitement par la méthode dite d'enroulement. *Thèse de Paris*, 1885.

468. Dolschenkow. Combustion of the conjunctiva simultaneously with the use of iodine. *Wjestnik ophth.*, May–June, 1885.

469. Hübscher. De l'influence du traitement ordinaire sur le gonococcus de la conjonctivite purulente des nouveau-nés. *Arch. d'ophth.*, 1885, vol. v., 4, p. 306.

470. Saswornitzky. On rheumatism of the joints due to blennorrhœa of the conjunctiva. *Wjestnik ophth.*, May–June, 1885.

471. Salomon, J. V. The use of alum in purulent ophthalmia. *Brit. Med. Jour.*, July, 1885, p. 101.

472. Tweedy, J. The use of alum in purulent ophthalmia. *Brit. Med. Jour.*, July, 1885, p. 16.

Böckmann (466) operates for pterygium as follows: The pterygium is detached from the cornea to the margin. The thickened edges are then abscised, the conjunctiva is raised, the subconjunctival tissue seized with forceps and carefully removed, and the conjunctiva placed in its right position. A compressive bandage is then applied. The wound heals in a week, and the conjunctiva is firmly united to the sclera in the region of the

wound. The eye is freely movable and the pterygium does not relapse. SCHJÖTZ.

DARRIGADE (467) reports nine cases of pterygium successfully operated by rolling them inward. MARCKWORT.

DOLSCHENKOW (468) observed combustion of the conjunctiva simultaneously with the internal use of iodide of sodium (2.5 grm. pro dosi twice daily) and insufflation of calomel into the conjunctival sac. HIRSCHMANN.

HÜBSCHER (469) found that in thirty-nine cases of blennorrhœa neonatorum at Dr. Landolt's clinic, in which the vaginal discharge of the mother was examined, the gonococci were present in the latter when they were found in the conjunctival secretion, and absent when none were discovered in the conjunctival sac. In 16 among 63 cases the cornea was also affected when the coccus was present; in the other cases it remained unharmed. The discharge should therefore be sterilized at once by instillations of a sublimate solution, 1 : 5000, energetic ice applications, and, when the discharge is simply purulent, lap. mit. 1 : 1. As the improvement progressed the number of gonococci decreased. In one case they were difficult to find on the fourth day, and on the sixth had entirely disappeared. V. MITTELSTÄDT.

SASWORNITZKY (470) reports on a new-born child (whose father had communicated gonorrhœa to the mother, giving rise to metroperitonitis after birth), in whom blennorrhœa developed in both eyes; while the disease was at its height inflammation of the right elbow- and wrist-joint set in, afterward of the left knee- and ankle-joint.

SALOMON (471) recommends alum in purulent ophthalmia, while TWEEDY (472) prefers other astringents. FITZGERALD.

473. COURSSERANT. Abscès de la cornée. *France méd.*, 1885.

474. DAGUILLON. Trois cas de kératocone. *Bull. de la clin. nat. ophth.*, 1885. vol. iii., p. 135.

475. KNAPP, H. The treatment of corneal infiltration with the actual cautery. *Med. News*, 1885. Amer. Ophth. Soc.

476. MAYERHAUSEN, G. An unintentional tattooing of the cornea. *Centralbl. f. prakt. Augenhk.*, 1885, p. 230.

477. PANAS. Considérations sur le traitement du kératocone avec une observation nouvelle à l'appui. *Arch. d'ophth.*, 1885, vol. v., 4, p. 348.

478. PANAS ET VASSAUX. Étude expérimentale sur la tuberculose de la cornée. *Arch. d'ophth.*, 1885, vol. v., 3, p. 193.

479. Roy, L. et Alvarez. Observation clinique du bacille de la tuberculose dans la cornée. *Rev. clin. d'ocul.*, 1885, 8, p. 185.

480. Vossius, A. On central parenchymatous annular keratitis. (Keratitis interstitialis centralis annularis.) *Berl. klin. Wochenschr.*, 1885, Nos. 43 and 44.

Knapp (475) and Coursserant (473) recommend the galvanocautery in corneal ulcers due to mycotic infection, confirming the statements of Nieden, made in these Archives.

Mayerhausen (476) observed extensive tattooing of the cornea after a prick with a steel pen.

Panas (477) observed keratoconus develop in a female post-office clerk, 29 years of age, whose eyes had always been healthy and possessed of good vision; its cause could not be detected, and vision was reduced to quantitative perception of light in the course of three years. When first seen the right eye was also affected, and a keratoconus was discovered in both with a flat, scarcely recognizable vesicle at its apex. The tension was much diminished. All the symptoms were more marked in the left than in the right eye. There was no binocular vision, and the patient was obliged to close the left eye, which had been nyctalopic since the beginning of the affection. The right eye was almost completely cured in a few months by the use of eserine and a compressive bandage; the left did not improve until after the centre of the cornea had been touched with the thermo-cautery, when V rose to $\frac{20}{40}$. Binocular vision was restored. A number of keratoscopic figures, taken at various times, clearly indicate the course of healing. v. Mittelstädt.

Panas and Vassaux (478) produced tuberculosis of the peritoneum by the injection of tubercular sputa, and with the product vaccinated the cornea of eight rabbits. The result was always the same; after a period of incubation of 8–10 days tubercles developed beneath the epithelium, after the destruction of which an ulcer formed, which became larger by the development and disintegration of new tubercles. The ulcer may heal spontaneously, leaving a scar, without giving rise to tuberculosis in the eye or any other part of the body. The authors were induced to make these experiments by observing the development of small gray nodules, accompanied by symptoms of inflammation in a woman thirty years of age in whom pulmonary phthisis was suspected; the nodules developed into an ulcer, which grew by the apposition

and destruction of fresh nodules, but finally healed, leaving an extensive cicatrix. The authors consider this a case of corneal tuberculosis, and believe that spontaneous and vaccine-tuberculosis resemble certain deep-seated forms of keratitis, which are nothing else than benign forms of tuberculosis. In dubious cases the demonstration of the presence of bacilli or vaccination is necessary (which in the authors' case itself would not have been superfluous.—REV.). As spontaneous recovery is possible, and the danger of infection of the eye and the whole system is slight (even introduction into the vitreous rarely produced general tuberculosis), it is unnecessary to remove the eyeball either partially or entirely. The patient was cured. v. MITTELSTÄDT.

ROY and ALVAREZ (479) observed in a girl 4½ years old with beginning pulmonary phthisis a kind of parenchymatous keratitis, which was soon followed by a little tubercle in the ciliary region. From this point tubercular infiltration of the cornea with genuine tubercle nodules developed—the picture of vaccine-tuberculosis. The tubercle-bacilli were found exclusively in the corneal parenchyma, not only free in the tissue, but also enclosed in giant-cells; none were found in the disintegrating masses at the surface. The authors think the trouble began in the cornea.

v. MITTELSTÄDT.

VOSSIUS (480) calls attention to a form of keratitis interstitialis centralis annularis, which he had occasion to observe several times. A dense central annular opacity extends through the whole thickness of the cornea, the centre of which remains clear for a comparatively long period of time. A vascular and non-vascular form occur. In the latter there is not the slightest injection, and there is a diffuse opacity of the cornea; within the opacity appears an evenly dense, rather broad ring, generally already closed when becoming visible, of a bluish-gray or white color, in front of the pupil; its centre is comparatively clear. The periphery of the cornea is also only slightly opaque. The other parts of the eye are not affected. The annular opacity advances from the margin towards the centre of the cornea, at the same time clearing up at its edge. It finally disappears after having reached the centre. The vascular form lasts much longer. It is accompanied by inflammatory symptoms, pericorneal injection, ciliary pains, vascularity of the cornea, and hyperæmia of the iris. The prognosis is good in all cases, although the disease lasts a long time. It occurs in persons between the ages of five and

twenty. Hereditary syphilis could not be traced with certainty, but in most cases it was not improbable.

481. ABADIE. Des plaies pénétrantes intraoculaires. *Union méd.*, 1885, p. 349.

482. SCHULTHEISS, B. Contribution to the knowledge of the congenital changes of the sclero-corneal margin and the anterior portion of the uveal tract. *Zeitschr. f. vergl. Augenhk.*, vol. iii., p. 84.

ABADIE (481) recommends disinfection of scleral wounds as soon as possible, closure with silk sutures dipped into a sublimate solution and application of an antiseptic bandage. When these measures are adopted he claims that the prognosis of wounds in the region of the ciliary body is much better than is generally assumed. MARCKWORT.

In the eyes of a setter SCHULTHEISS (482) found the anterior layers of the lower third of the cornea replaced by conjunctival tissue, the parenchyma itself by tissue the structure of which did not differ in any way from true scleral tissue. There was also circumscribed infiltration of the cornea with pigment and imperfect development of the anterior portion of the uveal tract.

483. FUCHS, E. Free cyst in the anterior chamber. *Arch. f. Augenhk.*, vol. xv., 1, p. 7.

484. ANDREWS, J. A. Olive oil as menstruum for dissolving cocaine for application to the eye. *Amer. Ophth. Soc.*, 1885.

485. BELJARMINOW, L. The unfavorable general action of cocaine when applied to the conjunctiva. *Rusk. Med.*, 1885, No. 3.

486. REICH. Further communications on the toxic action of cocaine in ophthalmology. *Rusk. Med.*, 1885, No. 30.

ANDREWS (484) recommends cocaine dissolved in olive oil, as it thus remains longer in contact with the part to be anæsthetized. As soon as a little acid is added to the salt of cocaine, and the solution is heated in the water-bath, the cocaine dissolves in the oil. BURNETT.

BELJARMINOW (485) describes five cases from the clinic of Prof. Dobrowolsky, in which instillations of a four-per-cent solution of cocaine (muriate of cocaine from Merck) were followed 1½ to 2 hours later by toxic symptoms—weakness, perspiration, dizziness, nausea, vomiting, meteorism. The vomiting was speedily controlled with wine. All five persons were weak, aged women (41–73 years old). No toxic symptoms were observed when a two-per-cent solution was used. HIRSCHMANN.

In a girl, ten years of age, REICH (486) observed weakness, pallor of the face, nausea, and vomiting, after the instillation of 10–12 drops of a two-per-cent. solution of cocaine into the conjunctival sac for an iridectomy. In a woman, sixty years old, instillation of 8–10 drops of a two-per-cent. solution, for division of a secondary cataract, was followed two hours later by pain in the eye and head, weakness, perspiration, trembling of the hands, and dizziness. A few hours later all these symptoms had disappeared.

HIRSCHMANN.

Sections XII.–XXI., reviewed by DR. NIEDEN.

XII.—IRIS.

487. CANT. Serous cyst of iris. *Rep. Ophth. Soc. Great Brit.*, p. 57.

488. FOX WEBSTER. Sarcoma of iris. *Rep. Amer. Ophth. Soc.* at New London, July 16, 1885, p. 23.

489. HÄNSELL. Recherches sur le staphylome. *Bull. de la clin. nat. des quinze-vingts*, 1885, vol. ii., p. 21.

490. HODGES. Granular-looking body on iris. *Rep. Ophth. Soc. Great Brit.*, p. 59.

491. LANG. Growth on iris. *Rep. Ophth. Soc. Great Brit.*, p. 60.

492. MANOLESCU, W. (Bucharest). Aniridie apparente consécutive à l'inflammation de la chorioide. *Arch. d'ophth.*, 1885, vol. v., 5, Sept.-Oct., p. 449.

493. MYLES STANDISH. A case of tubercle of the iris. *Rep. Amer. Ophth. Soc.*, July 16, 1885, p. 27.

CANT'S (487) case was one of a man, aged forty, who had received an injury in the right eye when a boy ; severe inflammation at the time, from which he completely recovered. Laterly sight began to fail. A small cyst, about the size of a pea, was observed to be growing from the periphery of the upper segment of the iris. Cyst removed with a piece of iris ; great improvement in vision.

FITZGERALD.

FOX (488) removed a sarcoma of the iris, which had existed for about a year and had produced glaucoma, with blindness lasting for six hours. After the operation V rose to $\frac{20}{30}$. BURNETT.

HODGES (490) reports the case of a girl, aged seventeen, who noticed that her right eye was red and painful some days before

she consulted H. A granular-looking body, the size of a millet-seed was observed on the outer rim of the right iris, close to the sclera; slight ciliary injection. Iritis set in with adhesions, and anterior chamber half full of pus. The latter was evacuated, re-accumulated, but was subsequently absorbed. The granular body increased and perforated the sclera. Specks formed in the deeper layers of the cornea. T = 1. No history of tubercle or cancer.

FITZGERALD.

LANG (491) found in a child, aged five, numerous growths of a yellowish color on the iris, with blood-vessels plainly seen on the surface. The growths gradually coalesced and filled the lower parts of the anterior chamber. Family history good.

FITZGERALD.

MANOLESCU (492) observed in a young man, aged twenty, with symptoms of hereditary syphilis, a gradual complete disappearance of the iris after an acute inflammation of the choroid (ciliary injection, choroidal hemorrhages). Under specific treatment the choroiditis healed, leaving two small scleral staphylomas. In the beginning of the affection the pupil was widely dilated, so that only a small rim of iris was visible above. Afterwards not a trace of it could be found, neither were any ciliary processes visible. Manolescu thinks that shrinking exudations at the insertion of the iris were the cause of the apparent aniridia.

v. MITTELSTÄDT.

MYLES STANDISH (490) observed a tubercle of the iris in a girl aged fourteen, near the ciliary margin, about 2 *mm.* in diameter. It grew rapidly and the eyeball was therefore enucleated. On examination giant-cells and a few bacilli were found. BURNETT.

XIII.—CHOROID AND CILIARY BODY.

494. ALBINI, E. Exenteratio bulbi. *Gaz. a'ospit.*, vol. vi., p. 80–82.

495. AUB, J. Case of cyst of the ciliary body. *Amer. Jour. Ophth.*, May–June, 1885.

496. CRITCHETT and JULER. Disseminate choroiditis. *Rep. Ophth. Soc. Great Brit.*, p. 161.

497. GALLENGA. Dell' idroftalmia congenita. *Annal. di ottalm.*, vol. xiv., 4.

498. HIRSCHBERG, J. An unusual case of coloboma of the ocular membranes. *C. f. A.*, vol. ix., p. 233.

499. JATZOW, R. Contribution to the knowledge of the retrobulbar propagation of the choroidal sarcoma and the question of the course of the fibres in the region of the optic nerve. *v. Graefe's Arch. f. Ophth.*, vol. xxxi., p. 205.

500. MILLES. Nævus of temporal orbital region and of choroid. *Rep. Ophth. Soc. Great Brit.*, p. 168.

501. MULES. Tubercle of the choroid. *Eod. loc.*, p. 159.

502. NETTLESHIP. Peculiar lines in the choroid in a case of postpapillitic atrophy. *Eod. loc.*, p. 167.

503. NETTLESHIP. Central guttate choroiditis. *Eod. loc.*, pp. 162 and 164.

504. ROLLAND. Du phlegmon de l'œil. *Rec. d'ophth.*, July 1885, p. 386.

505. SCHIESS-GEMUSEUS. Case of choroidal sarcoma. *Jahresbericht d. Augenheilanst. Basel*, 1884–85.

506. VOSSIUS, A. Case of choroidal tumor which had caused blindness under the picture of plastic iridocyclitis. *v. Graefe's Arch. f. Ophth.*, vol. xxxi., p. 147.

507. VOSSIUS, A. Micro-chemical investigations on the origin of the pigment in the melanotic tumors of the eye. *v. Graefe's Arch. f. Ophth.*, vol. xxxi., p. 161.

ALBINI (494) reports on six cases of exenteration of the globe performed at Raymond's clinic at Turin. In four of them not only the cornea, but also the scleral ring, was abscised. The author does not consider the results very brilliant, as in two of the cases suppuration set in, and in one the stump was sensitive two weeks later; nevertheless he thinks that exenteration has many advantages over enucleation, and is therefore well worthy of attention. DANTONE.

AUB (495) saw in a man aged twenty-seven, a scar 3‴ from the cornea and 4‴ long, the result of a cut of the forehead and right eye. The lens was clear, the iris unchanged in color, but united in some places to the capsule. In the middle of the sclero-corneal scar a small pear-shaped cyst, containing clear liquid, extended into the vitreous and anterior chamber. There were a few pigmented spots on the surface, the lens bulged in this direction, $V = \frac{6}{200}$. The patient was seen only twice. BURNETT.

In CRITCHETT and JULER'S (496) case there was a distinct history of syphilis acquired five years previously. In the right eye V was normal, and yet innumerable whitish-yellow circular patches

were seen scattered over the fundus as well as in the region of the macula. An illustration is given of the appearance.

FITZGERALD.

GALLENGA (497) presents an interesting report of fifty cases of congenital hydrophthalmus, observed during the course of twelve years at the Turin clinic, and describes in detail the histological condition of five eyes, enucleated on account of this disease. In conclusion the author mentions three cases of acquired hydrophthalmus. DANTONE.

HIRSCHBERG (498) describes a case of triple coloboma of the choroid, besides coloboma of the iris ; examination of the field of vision showed that the retina was absent over both colobomata of the choroid. The case is similar to that of v. Hoffmann and Manz.

JATZOW (499) describes the clinical course and result of the autopsy of a case of choroidal sarcoma, which had extended to the brain by way of the optic nerve, yet had remained entirely unrecognized, so that the diagnosis was not made until the retrobulbar tumor was found when the eye was enucleated. A peripheral, downward and outward, scotoma had given rise to difficulties in the diagnosis, the other eye being entirely normal, but its cause was found in pathological changes in the chiasma when the tumor had advanced along the optic nerve into the cranial cavity. Just before the patient's death the defect of the visual field occupied the whole temporal half. The diffuse choroidal tumor had perforated the sclera, passed along the ciliary arteries to the sheath of the optic nerve, into it, and had then proliferated both towards the brain and the eyeball. It had involved the chiasma and passed thence to the optic nerve of the other eye ; its growth in the orbit of the eye first affected was so slight that not a trace of exophthalmus or diminution of mobility could be detected. The author then proceeds in the light of this case to analyze the course of the fibres in the optic nerve (papilla and macula), chiasma, and optic tractus, as it has previously been traced by Samelsohn, Nettleship, and Vossius, and adds instructive drawings. In regard to the visual sphere of the occipital lobe Jatzow assumes, in opposition to Munk, that the periphery of the retina corresponds to the outermost layers of the cortex of the occipital lobe, while the fibres of the macula, both bundles apart, are situated in the depth surrounded by their peripheral fibres.

MILLES' (500) patient, a young man, aged fifteen, had been

born with a large birthmark involving the eyelids on the right side. Sight of the right eye had apparently been good up to the age of six, when it was found to be blind. It was excised and the retina was found to be detached. A roughly circular area of the choroid about 20 *mm.* in diameter, and occupying the posterior and outer part of the globe, consisted of a simple angioma formed of dilated veins and capillaries. FITZGERALD.

MULES (501) publishes a drawing of the fundus in a case the diagnosis of which was subsequently confirmed by a post-mortem examination. FITZGERALD.

In NETTLESHIP'S (502) case there were a number of straight lines in or upon the choroid running parallel with one another nearly in the horizontal direction. They were longest and broadest at the region of the yellow spot; equally numerous, though finer, to the nasal side of the disc. They looked as if due to a number of delicate ridges or plaits, such as might have been left by a subsidence of an œdema of the choroid. FITZGERALD.

NETTLESHIP (503) reports two cases of central guttate choroiditis, one a man aged sixty-one, the other a woman aged forty-one, both hypermetropic, and both free from any defect of sight. FITZGERALD.

ROLLAND (504) performed enucleation in seventy cases of beginning panophthalmitis, with good results in all. Rolland recommends enucleation in cases of injury as soon as a yellow reflex from the fundus, purulent opacities in the vitreous, and flakes of pus in the anterior chamber, coupled with severe pain, indicate with certainty the impending loss of the eye. He does not operate, however, when cerebral symptoms have manifested themselves. MARCKWORT.

After an injury of the eye with a piece of iron, which was followed by severe inflammation and amaurosis, SCHIESS-GEMUSEUS (505) saw a choroidal sarcoma develop four months later at the point of concussion, necessitating enucleation.

VOSSIUS (506) describes a case of sarcoma of the choroid which had developed under the symptoms of plastic iridochoroiditis complicated with staphyloma of the sclera, had spread diffusely over the whole posterior portion of the choroid, and had grown from the edge of the latter membrane through the foramen scleræ directly into the optic nerve. Shrinkage of a cyclitic exudation had produced, besides, perforation of the anterior capsule of the lens and cataract.

VOSSIUS (507) also describes his micro-chemical investigations on the origin of the pigment in the melanotic tumors of the eye. In the majority of them it was derived from the blood. He then adds the description of four cases of epibulbar and choroidal sarcoma.

XIV.—GLAUCOMA.

508. BRAILEY. Glaucoma. *Rep. Ophth. Soc. Great Brit.*, p. 113.

509. DRAKE-BROCKMANN. Glaucoma. *Ophth. Rev.*, July, 1885, p. 181.

510. GALLENGA. Studio clinico sul glaucoma. *Ann. di ottalm.*, vol. xiv., 2–3.

511. HARLAN, H. A case of hereditary glaucoma. *Journ. Amer. Med. Assoc.*, Sept. 12, 1885.

512. LAFFON. De la sclero-iridectomie dans le glaucome. *Thèse de Bordeaux*, 1885.

513. METLARDY. Glaucoma. *Rep. Ophth. Soc. Great Brit.*, p. 93.

514. NETTLESHIP. Hemorrhagic glaucoma. *Eod. loc.*, p. 108.

515. SCHNABEL, J. Contributions to the knowledge of glaucoma. *Arch. f. Augenhk.*, vol. xv., p. 311.

BRAILEY (508) reports an attack of glaucoma in a boy aged fourteen, which disappeared after the instillation of eserine.

FITZGERALD.

DRAKE-BROCKMANN (509) presents a statistical review of 108 cases of glaucoma treated at the Eye Infirmary, Madras.

FITZGERALD.

GALLENGA (510) publishes an exhaustive clinical report on 332 cases of glaucoma, treated during eleven years at the clinic at Turin (3.64 % of the whole number of patients). Of these, 178 were males, 154 females. Arranged according to age, it occurred in two cases between ten and nineteen; the maximum of 128 occurred between the ages of sixty and sixty-nine. The largest number of cases, 54, occurred in May, the smallest number, 16, in September. Seventy were cases of secondary glaucoma; in 59.5 % the right was affected, in 45.5 % the left. Of the 92 cases in which the refraction was determined, 52 % were slightly, 14.1 % hyperopic in a higher degree, 21 % were myopic, and 9.7 % emmetropic. One hundred and fifty were cases of simple glaucoma, 45 of acute and subacute, and 137 cases of complicated glaucoma.

In 321 cases paracentesis, sclerotomy, iridectomy, or enucleation was performed ; in 202 of these with good operative and therapeutic results, in 111 with only operative, and 8 without any good result.

HARLAN (511) observed hereditary glaucoma in a girl aged seventeen, who had chronic glaucoma in both eyes. The anamnesis showed that the mother had lost her sight from the same disease at the age of nineteen ; likewise the father of her mother at the age of eighteen. The great-grandmother on the mother's side, and the great-great-grandfather also, became blind from the same cause. An uncle of the mother became blind at thirty-five, an aunt at nineteen ; a cousin gradually lost his sight, and in another cousin an enucleation was performed on one eye and an iridectomy on the other. BURNETT.

LAFFON (512) recommends sclero-iridectomy according to Terson against glaucoma (*cfr.* Soc. franç. d'ophth., Jan. 26, 1885). He reports seventeen cases successfully treated according to this method. MARCKWORT.

METLARDY (513) recommends an extensive corneal section and iridectomy, with removal of the lens within the capsule, in cases of chronic primary glaucoma. FITZGERALD.

NETTLESHIP (514) describes a case of hemorrhagic glaucoma in a woman aged fifty-eight, with glaucoma in both eyes. Sclerotomy was performed on each, with only temporary relief to the left, which had subsequently to be enucleated. On section of the globe, the lower half of the retina was found to be studded with very numerous blood-patches of various sizes, which were suggestive of obstruction to the descending branches of the central vessels. N. was, however, unable to positively prove the existence of occlusion in any of the vessels. In another case, that of a woman aged forty-five, with double absolute glaucoma, the right eye exhibited retinal hemorrhages, thickening of the retinal veins, and obliteration of the arteries. FITZGERALD.

SCHNABEL (515) concludes in his paper on glaucoma that it is a disease of the blood-vessels of the eye, which develops either gradually or at once in the region supplied by the long posterior and anterior and posterior ciliary arteries, the central blood-vessels, and those of the scleral circle. Its essential features are arterial spasms and degeneration of the walls of the arteries ; when the former component predominates, acute glaucoma is the result ; when the latter, chronic glaucoma. The disturbances of nutrition

and function are the direct result of these disturbances of circulation. The circumstance that glaucoma is a disease of the blood-vessels, and no particulur part of the eye, explains the fact that finally no membrane or part of the eye remains healthy. The manifestations of glaucoma are best known in the iris, retina, and optic nerve. There is no glaucoma which is the result of increased tension only and its consequences (glaucoma simplex), neither is there such a thing as glaucomatous inflammation.

XV.—SYMPATHETIC OPHTHALMIA.

516. BRAILEY. Sympathetic ophthalmitis. *Rep. Ophth. Soc. Great Brit.*, pp. 62 and 85.

517. DEUTSCHMANN. The pathogeny of sympathetic ophthalmia. *v. Graefe's Arch. f. Ophth.*, vol. xxxi., p. 277.

518. FAUCHART. Réflexion sur quatre cas d'ophthalmie sympathique. *Thèse de Paris*, 1885.

519. FROST. Sympathetic ophthalmitis. *Rep. Ophth. Soc. Great Brit.*, p. 80.

520. NETTLESHIP. Sympathetic ophthalmitis. *Eod. loc.*, pp. 83 and 85.

521. WALKER. Sympathetic ophthalmitis. *Eod. loc.*, p. 83.

BRAILEY (516) considers "that there is no pathological evidence before us of the least value to show an actual travelling neuritis of any nerve as the cause of sympathetic ophthalmitis." He suggests that it is rather due to an altered nutritive state of the eye consequent on the inflammation, atrophy, or even absence of the exciting eye. This would render it liable far beyond other eyes to inflammations clearly dependent on constitutional conditions—*i. e.*, syphilis and rheumatism, and also to inflammations which, in the absence of such evidence, we are used to call spontaneous. Brailey also observed a case in which the left eye was injured by an extensive wound of the cornea and ciliary region. Two weeks later slight pain in the right eye, with failure of vision. The ophthalmoscope revealed the presence of neuritis. Under treatment V improved. FITZGERALD.

DEUTSCHMANN (517) adds four more observations of the occurrence of staphylococcus in eyes which had produced sympathetic ophthalmia in the other; cultures always produced the same symptoms of sympathetic irritation in the eyes of animals into which they were injected.

FAUCHART (518) reports four cases of sympathetic ophthalmia. Two were cured by inunction without enucleation ; in the third, also cured, both inunction and inoculation were resorted to. In the fourth case, which ended in atrophy, the eye was also enucleated, but inunction was not attempted on account of the feeble condition of the patient. MARCKWORT.

FROST (519) saw sympathetic trouble develop five days after enucleation of the exciting eye. Treatment consisted in instillations of atropine and injections of pilocarpine ; recovery.

FITZGERALD.

NETTLESHIP (520) observed sympathetic ophthalmia in a woman aged twenty-three. The injured eye was enucleated. Some time afterwards the other was affected with whitening of the eyelashes. In another case enucleation was performed within forty-eight hours after the infliction of severe contused wounds of the eyeball and orbit. Severe subacute iritis of the remaining eye set in several weeks later, probably sympathetic. Recovery of good sight. Nettleship considers the sympathetic nature of this case to be somewhat hypothetical, the facts which tell against the hypothesis being the apparently permanent recovery with good sight, and the patient's having had four years previously an attack of rheumatism in the hip, knee, and elbow on the same side.

FITZGERALD.

In WALKER'S (521) case the right eye, lost from an accident, had been excised on account of the left eye exhibiting signs of inflammation. In the right the pupil was quite closed, iris bulged forwards, and sclerotic thinned. Walker operated by grasping the false membrane with iris forceps, and tearing it out with some iris. There was some escape of vitreous, but considerable improvement of vision resulted. FITZGERALD.

XVI.—LENS.

522. AGNEW, C. R. A new operation for the removal of a dislocated crystalline lens. *Rep. Amer. Ophth. Soc.*, at New London, July 15, 1885.

523. FALCHI. Sulla lussazione del cristallino sotto la congiuntiva. *Giorn. d. R. Ac. d. Med. di Torino*, vol. xi., viii., 6, 7, and *Ann. di Ottalm.*, vol. xiv., 4.

524. FIEUZAL. Du meilleur procédé d' extraction de la cataracte senile. *Bull. de la clin. nat. ophth.*, April–June, 1855, p. 81.

525. Fox, L. Webster. Clinical observations of congenital cataract. *Rep. Amer. Ophth. Soc.* at New London, July 16, 1885.

526. Galezowski. Traitement médical de la cataracte. *Rec. d'ophth.*, July, 1885, p. 393.

527. Galezowski. Nouveau mode de pansement après l'extraction de la cataracte. *France méd.*, 1885, p. 1,418.

528. Galezowski. Du traitement chirurgical de la cataracte. *Rec. d'ophth.*, Aug., 1885, p. 457.

529. Harlan, C. Two cases of subconjunctival luxation of the lens. *Rep. Amer. Ophth. Soc.* at New London, July 15, 1885.

530. Higgens. Cataract-extractions. *Rep. Ophth. Soc. Great Brit.*, p. 116.

531. Panas, F. Du choix du meilleur procédé d' extraction de la cataracte. *Arch. d'ophth.*, July, Aug., 1885, vol. v., 4, p. 289.

532. Story. Cystoid cicatrix. *Rep. Ophth. Soc. Great Brit.*, p. 126.

533. de Wecker. Les indications de l'extraction simple. *Ann. d'ocul.*, 1885, vol. xciv., p. 29.

Falchi (523) describes two cases of subconjunctival dislocation of the lens, in one of which the lens was removed three weeks, in the other a year, after the injury. Comparatively good sight was preserved. The microscopic examination showed only slight changes in the lens which had lain three weeks under the conjunctiva ; the other had shrunken to half its original volume ; the nucleus was fairly well preserved, but the peripheral layers were converted into a granular mass, containing drops of myeline and residues of hemorrhages. Dantone.

Fieuzal (524) is not directly opposed to extraction without iridectomy, but wants to restrict the method to particular cases. Of the 1,718 extractions which he performed with an iridectomy 86 % were successful, 9 % moderately so, and 5 % failures, while in the 25 extractions without an iridectomy the result was good in 24 %, moderately good in 60 %, and a failure in 16 %.

Marckwort.

Webster Fox (525) reports two cases of cataract either congenital or acquired in infancy with occlusion of the pupil, in which good vision was obtained when the cataracts were removed at the age of sixty and sixty-two respectively. In the latter case the patient complained of erythropsia for months. Burnett.

Galezowski's (526, 527, 528) communications contain nothing

new, especially in regard to traumatic cataract. The cases reported by E. Jaeger, Stellwag, and Becker (Graefe-Saemisch, vol. v., p. 308) of spontaneous clearing up of lenticular cataract, are, in Galezowski's opinion, based on an error of diagnosis.

MARCKWORT.

HARLAN (529) reports two cases of subconjunctival dislocation of the lens, the result of a blow on the eye. In one fair vision was preserved, in the other the lens was removed and soon afterwards a staphyloma began to form. BURNETT.

HIGGENS (530) reports the results of two hundred cataract-operations. Two methods of extraction were employed, first a small flap section with an iridectomy either at the time or some weeks previously, and an oblique corneal section (Bader's or Liebreich's). Good results in 87.5 per cent. FITZGERALD.

PANAS (531) thinks it is time "to escape from the operative anarchy which has prevailed since A. v. Graefe modified the classical flap-extraction as practised by Daviel and his successors." He pleads earnestly for the return to this method. Its great advantage in comparison with Graefe's method is the avoidance of an iridectomy, so that the "resultat esthétique" is infinitely better, while many unpleasant complications and bad results are avoided, such as hemorrhage into the anterior chamber, escape of vitreous (in only two per cent., since the introduction of cocaine none in uncomplicated cataracts), incarceration of the capsule, iritis and iridocyclitis, etc. He also claims that the uninjured iris prevents the transmission of suppuration from the cornea to the uveal tract, of which Panas thinks he convinced himself in two cases. In one hundred cases V rarely was $< \frac{1}{2}-\frac{1}{3}-\frac{1}{4}$. The optical disadvantages of the coloboma are best seen in patients who have been operated according to both methods. Panas makes the puncture and counterpuncture in the limbus. The extent of the section is equal to about $\frac{1}{3}-\frac{2}{5}$ of the circumference of the cornea.

V. MITTELSTÄDT.

STORY (532) is in favor of treating cystoid cicatrix by dividing the cyst horizontally and following this up with frequent applications of the nitrate of silver to the wound. (This has proved dangerous.—K.) FITZGERALD.

DE WECKER (533) discusses in a second essay the advantages of simple extraction over combined extraction. Excision of the iris should be performed immediately after the corneal section in restless patients and those who cannot be kept entirely quiet

the first three or four days. Excision of the iris should be the last operative act in unripe and tenacious cataracts which require more prolonged manipulation; also when difficulty in replacing the iris indicates the presence of increased pressure, exposing the eye to the danger of prolapse of iris. In all other cases iridectomy should not be performed. MARCKWORT.

XVII.—VITREOUS.

534. MITTENDORF, W. F. Pneumophthalmus, or air in the vitreous humor. *Amer. Ophth. Soc.* at New London, July 16, 1885.

MITTENDORF (534) reports two cases, both instances of penetrating wounds. They produced no disturbance, and had completely disappeared after forty-eight hours. They somewhat resembled oil globules. BURNETT.

XVIII.—RETINA AND FUNCTIONAL DISTURBANCES.

535. FILEHNE, W. The cause of the *Lichtstaub*, of blindness due to prolonged staring, and of the after-images. A contribution at the same time to the knowledge of chronic tobacco-amblyopia. *v. Graefe's Arch. f. Ophth.*, vol. xxxi., p. 1.

536. GUNN. Direct arterio-venous communication on the retina. Case with an illustration. *Ophth. Soc. Great Brit.*, p. 156.

537. HOWE, L. Abortion for the albuminuric retinitis of pregnancy. *Amer. Jour. Ophth.*, May–June, 1885.

538. LEPLAT. Note sur un cas d'embolie de l'artère centrale de la rétine (with integrity of a macular branch). *Ann. d'ocul.*, 1885, vol. xciv., p. 116.

539. MACKENZIE. Retinal hemorrhage. *Ophth. Soc. Great Brit.*, p. 132.

540. NETTLESHIP. New blood-vessels in vitreous. *Eod. loc.*, p. 150.

541. PANAS. Traitement de la rétinite syphilitique. *Union méd.*, 1885.

542. RUMSCHEWITSCH, K. Coloboma of the yellow spot. *Wjestnik ophth.*, 1885, p. 296.

543. TAY. Changes in region of macula. *Ophth. Soc. Great Brit.*, p. 158.

FILEHNE (535) publishes a short interesting autopathography of tobacco-poisoning, which confined itself to the functions of the retina, without producing any constitutional disturbances except a tendency to diarrhœa. Although he totally abstained from the

use of tobacco, sight grew worse for four weeks afterwards, and then improved. There was therefore a cumulative action of the nicotine. He also made the interesting observation that if tobacco was used while recovery was taking place there was an undoubted improvement of V, which was rapidly followed by a marked deterioration. The moderate use of alcoholic drinks had the same effect. Strychnine, injected subcutaneously, acted similarly ; at first marked improvement, then impairment.

HOWE (537) presents a general review of the question of abortion in retinitis albuminurica during pregnancy. In two cases of his own the result was very beneficial. BURNETT.

LEPLAT (538) publishes a case of embolism of the central retinal artery with integrity of a small macular branch and preservation of the field of vision corresponding to the latter. The red spot at the macula lutea had disappeared ; it differed from the remainder of the retina only by its somewhat darker color. Leplat does not think that the small preserved branch was a cilio-retinal blood-vessel, but one which left the central retinal artery within the optic nerve, and had thus escaped obturation. He then discusses the cilio-retinal blood-vessels, and maintains their existence against Schnabel and Sachs (*cfr.* these ARCH., vol. xv., Ger. ed). MARCKWORT.

MACKENZIE (539) reports three cases of hemorrhagic retinitis complicated with hematemesis, for ulcer of the stomach, two of cancer with great anæmia, and one of scurvy. In all the cases reported by Mackenzie the corpuscular richness was below 50 % of the normal, the hemoglobine being in some of the cases reduced to an equal or greater degree. "From a consideration of these cases the conclusion may be drawn that when the corpuscular richness falls below 50 %, or below half the normal quantity, the tendency to hemorrhage becomes developed." FITZGERALD.

NETTLESHIP (540) reports the case of a man aged fifty, the subject of syphilitic retinitis with retinal hemorrhages and growths of new blood-vessels from the disc into the vitreous humor. FITZGERALD.

PANAS (541) discusses the treatment of syphilitic retinitis. Instead of chlorate of potash for preventing mercurial stomatitis Panas uses the following tooth-powders : Kal. chlor. 25.0, cort. chin. 10.0, catechu 10.0, tannin 1.0, calc. carbonic. ppt. 10.0, ol. menth. pip. gtt. v. M. Ft. pulv. subtiliss. MARCKWORT.

RUMSCHEWITSCH (542) describes two cases of coloboma of the

macula, and presents an analysis of all cases thus far described, from which he concludes that as yet no satisfactory explanation can be given. HIRSCHMANN.

TAY (543) describes the case of a male infant aged six months, the third instance in the same family of symmetrical changes in the region of the yellow spot in each eye, closely resembling those of embolism. When a few weeks old the child showed marked evidences of optic neuritis and now has atrophy of the optic nerves. It is beginning to fail as the first child did. The case of the latter is reported in vol. i of the *Trans.* He died at the age of one year and eight months. The second, who had definite epileptiform convulsions, died when one year and six months old.

FITZGERALD.

XIX.—OPTIC NERVE.

544. PARISOTTI et MELOTTI. Un cas d'atrophie des deux papilles par intoxication saturnine. *Rec. d'ophth.*, Sept., 1885, p. 520.

545. RAMPOLDI. Un notevole case di neurite retrobulbare. *Ann. di. ottal.*, vol. xiv., 2–3.

546. REMAK, A. (Jany's eye-clinic.) Case of excessive development of excrescences in the papilla in a typical retinitis pigmentosa. *C. f. A.*, vol. ix., p. 257.

547. SCHMIDT, E. On optic neuritis. (From the clinic of Prof. Hirschmann at Charkow.) *Wjestnik ophth.*, 1885, p. 273.

548. WADSWORTH, O. F. Case of double optic neuritis and ophthalmoplegia from lead-poisoning. *Rep. Amer. Ophth. Soc.*, at New London, July 16, 1885, p. 28.

PARISOTTI and MELOTTI (544) report a case of atrophy of both optic nerves due to lead-poisoning. The patient had unsteady fixation, but no nystagmus. The pupils were at first widely dilated, but reacted to light and accommodation. V was very much reduced. The color-sense was entirely absent. The ophthalmoscope revealed a white papilla with sharp edges, arteries of normal size, slight engorgement of the veins, traces of affection of the walls of the blood-vessels, and in the left eye an extensive atrophic spot in the region of the macula lutea, due to a hemorrhage. The constitutional symptoms left no doubt as to the diagnosis. There was no albumen in the urine. According to Parisotti and Melotti the changes in the fundus are due to an affection of the walls of the arteries, the direct consequence of the lead-poisoning. MARCKWORT.

In RAMPOLDI's (545) patient, who suffered from retrobulbar neuritis, first the left and six weeks later the right eye was affected, reducing V to the perception of light. Complete recovery with V = $\frac{8}{10}$ after slight leeching and tonic treatment. DANTONE.

REMAK (546) adds another case of excrescences confined to the circumference of the papilla in retinitis pigmentosa to those published by Anke (see previous part of report); it occurred in a patient aged fifty-two with aphakia, who was also affected with chorio-retinitis pigmentosa atypica and atrophy of the optic nerve. V was therefore not much improved by the operation.

SCHMIDT (547) presents a review of the cases of optic neuritis and neuro-retinitis recorded in the books of the opththalmic clinic at the University of Charkow and the private practice of the reviewer, and treated between 1870 and 1882 inclusive. The notes are mostly very brief. The cases treated during the last three years were also observed by the author, at that time assistant. Among 72,141 eye-patients there were 279 cases of neuritis, papillitis, and neuro-retinitis, *i. e.*, 0.4 per cent. Of these 168 were males and 111 females. They were divided according to age as follows:

10 or less.	10 to 20.	20 to 30.	30 to 40.	40 to 50.	Older than 50.
13.	37.	88	81	37	23

Only 31 cases were unilateral. Simple papillitis occurred in 180 cases, papillo-retinitis in 82 cases, neuritis retrobulbaris in 17 cases (not including the central scotoma in tobacco- and alcohol-poisoning). In two cases the development of connective tissue from the inflamed optic nerve into the retina and vitreous was observed, presenting the picture of Manz's retinitis proliferans. In only 120 cases the etiology was recorded with some degree of exactness, as the following table shows:

	Intracranial processes excl. of syphilis.					Injuries.	Chronic poisoning.	Syphilis.	Prolonged fasting.	Pregnancy.	Heart diseases.	Kidney diseases.	Menstrual disturbances.	Malaria and infectious diseases.	Cold.	Sympathetic neuritis.
	Tumor in cranio.	Encephalitis.	Hydrocephalus int.	Not accurately defined.	Orbital processes: retrobulbar tumors.											
Papillitis . .	8	1	2	14	4	4	1	14	8		3	1	1		1	1
Papillo-retinitis	2	1		6	2	1		17	1	2	1	7	1	3	1	
Neuritis retrobulbaris .				2		1	1	3	2	1	1			1		
Total.	10	2	2	22	6	6	2	34	11	3	5	8	2	4	2	1

The termination is accurately stated in only 95 cases: Complete recovery with restoration of V in 6 cases, marked improvement in 33 cases, total atrophy of the optic nerve in 19 cases, incomplete atrophy in 29 cases. The ophthalmoscopic picture and function remained unchanged in 3 cases during the long period of observation. Death in consequence of the primary disease in 5 cases, in one of them while the eyes were improving. Three post-mortems. HIRSCHMANN.

WADSWORTH'S (548) patient was a boy nine years of age, in whom there was double optic neuritis, difference in the size of the pupils, reduced vision, paralysis of the internal and external recti muscles of the left, and diminished movement outward, inward, and slightly downward. There was a low general condition which was deemed due to lead-poisoning, a bit of lead pipe having been found in the cistern from which the water he drank was taken. Lead was found in the urine. BURNETT.

XX.—INJURIES AND FOREIGN BODIES (PARASITES).

549. ADDARIO. Su di un nematode dell' occhio umano. *Ann. di ottalm.*, vol. xv., 2, 3.

550. BIRNBACHER, A. Chip of iron which had remained in the iris for twenty-five years. *C. f. A.*, vol ix., p. 228. Microscopical examination.

551. DERBY, HASKET. Two cases of penetration of the eyeball by scissors during the operation for strabismus. *Amer. Ophth. Soc.*, at New London, July 15, 1885.

552. MINOR, J. L. A case of cysticercus in the vitreous. *Med. Rec.*, Dec. 27, 1884.

553. MINOR, J. L. Removal of a piece of steel from the crystalline lens with the electro-magnet. *Amer. Ophth. Soc.*, at New London, July 15, 1885.

554. TREITEL, TH. Report on four operations for cysticercus cellulosus. *Arch. f. Augenhk.*, vol. xv., p. 257.

555. VALUDE, E. Contribution à l'étude des processes inflammatoires de l'œil (Note sur un cas de panophthalmie recuilli par le professeur O. Becker, et étudié au laboratoire de la clinique ophth. de Heidelberg). *Arch. d'ophth.*, 1885, vol. v., No. 5. July–April, p. 328.

ADDARIO (549) describes a guinea-worm, 95 *mm.* long, and sexually not developed, which he found under the ocular conjunctiva

of the right eye of a woman 70 years old. The worm differed anatomically from the nematodes thus far described, and the author is therefore inclined to regard it as a new species.

DANTONE.

HASKET DERBY (551) reports two cases of penetration of the eyeball by scissors during the operation for strabismus. In one V was not affected, in the other it was reduced to $\frac{7}{10}$. In the discussion which followed Knapp reported three similar cases, all of which healed without reaction. BURNETT.

MINOR (552) reports a case of cysticercus in the vitreous, a very rare occurrence in the United States. The patient would not consent to an operation. BURNETT.

MINOR (553) removed a piece of steel from the lens with the electro-magnet after it had been embedded for a month. He entered the globe with a magnetized squint-hook, bringing the latter in direct contact with the instrument outside the eye.

BURNETT.

Of the four cases of cysticercus reported by TREITEL (554) one was found in the anterior chamber, one in the vitreous attached to the walls of the globe, a sub-retinal one, and one freely movable in the vitreous; the last alone could not be removed from the interior of the eye by a meridional section.

VALUDE (555) describes at length the condition of an eye removed at the Heidelberg ophthalmic clinic on account of irido-cyclitis. It was apparently injured about thirty years ago by a piece of gun-cap and had become partially blind. A very acute irido-cyclitis had developed without any assignable cause from the adherent leucoma, the result of the injury, and was ascribed by the author to fresh septic infection, though no micro-organisms were found. The discovery of mast cells is interesting and new, and the author devotes an extra chapter to them (their chief distinctive feature is the readiness with which their granular protoplasm imbibes aniline colors, whereas their nucleus remains unstained.—K.). They were first described by Ehrlich, *Arch. f. Physiol.* of Dubois-Reymond, 1879, p. 166. They were found principally at the periphery of the vascular openings and in the neighborhood of the epithelium, in the ciliary body at the base of the ciliary processes, and in the inflamed conjunctiva. They were stained distinctly by a solution of carmine-alum, still better by hematoxyline. A peculiar hyaline degeneration of the pus-corpuscles is also worthy of mention; it was observed in some sub-

retinal coliections of pus and in pus in the anterior chamber, in the latter particularly in the pupillary region.

V. MITTELSTÄDT.

XXI. OCULAR AFFECTIONS IN CONSTITUTIONAL DISEASES.

556. EDMUNDS and LAWFORD. Intracranial tumor and optic neuritis. *Ophth. Soc. Great Brit.*, vol. iv., p. 172.

557. HALLOPEAU. Essai de la localisation d'une cécité accompagnée d'hemichorée. *Union méd.*, May, 1885. Probably due to embolism of an artery of the corpora quadrigemina of the right side.

558. KÖNIGSTEIN. Ophthalmic communications. *Wiener med. Presse*, Nos. 19, 21, 27. (1) Case of ischæmia retinæ and amblyopia fugax in childbed. (2) Lymphomatosis and complicated paralysis of the ocular muscles and neuro-retinitis of both eyes, due to engorgement of lymph in the brain and orbital cavity.

559. RAMPOLDI. Di talune malattie degli occhi in rapporto con l'elmintiasi intestinale. *Gazz. d'ospit.*, May, 1885, vol. iv., and *Ann. di ottalm.*, vol. xiv., 2, 3.

560. RAMPOLDI. La pellagra e il mal d'occhi. *Ann. di ottalm.*, vol. xiv., 2, 3.

561. REMAK, B. Three cases of tabes in childhood (Hirschberg's clinic). *Berl. klin. Wochenschr.*, 1885.

562. STEINHEIM, B. Nuclear paralysis of the abducent nerve, and polyuria. *Deutsche med. Wochenschr.*, 1885, No. 30.

563. STRÖM, H. Meningitis after enucleation of eye. *Norsk. Mag. f. Lägewid*, vol. xv., 4, p. 242. Christiania, 1885.

564. ZYCHON. De la goutte oculaire. *Rec. d'ophth*, July–September, 1885.

EDMUNDS and LAWFORD (556) give an analysis of one hundred and seven fatal cases of cerebral tumor, collected from various sources, with the view of establishing the opinion they have already expressed, viz., that the optic neuritis which occurs in intracranial disease is due to the presence of a secondary meningitis. The two most noteworthy points of the analysis are: (1) The immunity from optic neuritis of the cases of tumor in the cortical motor area. Cases in which paralysis of one limb occurred, or convulsions starting in one part. In none of the cases was there optic neuritis when first looked for. (2) The severity with which optic neuritis occurred in the cerebellar tumors; out of twenty-

three cases twenty had optic neuritis when first examined, and in nine of the cases it progressed to blindness. In all the cases towards the convexity of the brain, fifty per cent had optic neuritis when first examined. On the other hand, in the cases towards the base seventy-four per cent. had optic neuritis.

FITZGERALD.

RAMPOLDI (559) reports four more cases of affection of the accommodation, spasm of the lids, and nystagmus, due to worms in the intestinal canal. In a boy under treatment for tapeworm the author diagnosticated a subretinal cysticercus. DANTONE.

RAMPOLDI (560) has repeatedly observed retinitis pigmentosa and idiopathic hemeralopia in persons suffering from pellagra, so that he is inclined to consider the cachexy produced by this disease the cause of the affections mentioned. To the same cause he attributes some cases of atrophy of the optic nerve, cataract, corneal inflammation and ulcers, opacities of the vitreous, one case of decreased tension of the globe, and one of synchisis scintillans.

DANTONE.

REMAK (561) observed tabes (1) in a girl twelve years old, whose parents were syphilitic, in whom ptosis, double vision, and amblyopia due to atrophy of the optic nerve, developed after an injury to the skull; (2) in a boy aged fourteen with atrophy of the optic nerve, in whose history no indications of hereditary syphilis could be found; (3) in a boy aged sixteen, the child of syphilitic and neuropathic parents, with atrophy of the optic nerve and Romberg's and Westphal's symptoms.

STEINHEIM (562) reports a case of nuclear paralysis of the abducent nerve, produced by a blow with a stone on the occipito-temporal bone. It was complicated with diabetes insipidus, probably due to hemorrhage at the floor of the fourth ventricle. The patient recovered.

STRÖM'S (563) patient had an attack of chills with headache the fourth day after enucleation, and died nine days later under symptoms of meningitis. *Post-mortem:* Purulent meningitis. The day before the chill a case of erysipelas was discovered in the same room. SCHIÖTZ.

ZYCHON (564) describes at length the results of the uric-acid dyscrasy (la goutte) upon the eye. After some introductory historical remarks on the disease itself, he discusses the following affections of the eyes which result from it: (1) Lithiasis; (2) dry eczema of the lids (treatment: calomel); (3) kératite calcaire

(ribbon-shaped keratitis); (4) scleritis; (5) iritis (hemorrhages into the anterior and posterior chamber are of importance in distinguishing it from other forms of iritis); (6) choroiditis and cyclitis; (7) retinitis and chorio-retinitis (very rare; Galezowski observed fifteen to twenty cases; it generally takes the form of an exudative retinitis confined to the macula, and can be distinguished from albuminuric retinitis by being generally confined to one eye, the absence of hemorrhages, fatty degeneration, and peripapillary œdema; (8) cataract; (9) glaucoma; (10) arterial thrombosis of the retina; (11) "migraine ophthalmique"; (12) paralysis of the oculomotor and abducent nerves, due to thrombosis of intracranial arteries. MARCKWORT.

MISCELLANEOUS NOTES.

Dr. EWERSBUSCH, of Munich, has been appointed Professor of Ophthalmology at the University of Erlangen, to succeed Professor SATTLER.

Dr. HAAB, of Zurich, has been appointed Professor of Ophthalmology at the University of Zurich, to occupy the chair recently resigned, for reasons of sickness, by Professor HORNER, whose health, however, has much improved of late.

REVIEWS.

A Reference Hand-Book of the Medical Sciences. Edited by ALBERT H. BUCK, M. D., vol. i. New York: Wm. Wood & Co., 1885. (To be completed in eight volumes. Sold only by subscription.)

This work, which is modelled on Eulenburg's "Real Encyclopædie," is intended to supply the profession with short but fully digested treatises on all subjects pertaining to medical science. All the articles are by Americans, and by accepted authorities in their respective departments. The time never was when a special practitioner could afford to keep himself aloof from the general current of medical progress, and still less can he do so now, when the links binding general medicine and pathology to the special branches are growing every day firmer and closer. To the ophthalmologist who has not time or facilities for hunting up for himself the latest utterances of general medicine, surgery, or pathology on any given subject that may have a bearing on his studies, this work will be a great boon. He will find too that topics in his own branch are treated with a thoroughness which is not to be found in any one English text-book on ophthalmology. We have not space to point out in detail the value of each of the separate articles, but must content ourselves with giving the titles of the papers and their authors. "Accommodation and Refraction" is treated under two heads—physiological, by H. Gradle, and pathological, by John Green, the whole occupying sixteen pages; "Arcus Senilis," by Huntington Richards; "Artificial Eyes," by Wm. Oliver Moore; "Asthenopia," by John Green; "Astigmatism," by John Green. The article on "Blindness," by J. L. Minor, is a paper of great value; "Brain," in the various diseases in which the oculist is particularly interested, is treated of by several persons, the part on tumors being by Mary Putnam Jacobi. The closing article of the volume is on "Cataract," from the pen of H. Derby, of Boston, comprising seventeen pages. It concerns itself chiefly with the different methods of extraction. The article is worthy of careful perusal, reflecting as it does the judgment of one of the most expert of America's ophthalmic surgeons.

S. M. B.